AVIATION WEEK

A McGRAW-HILL PUBLICATION

MAR. 24, 1952

50 CENTS

Grumman

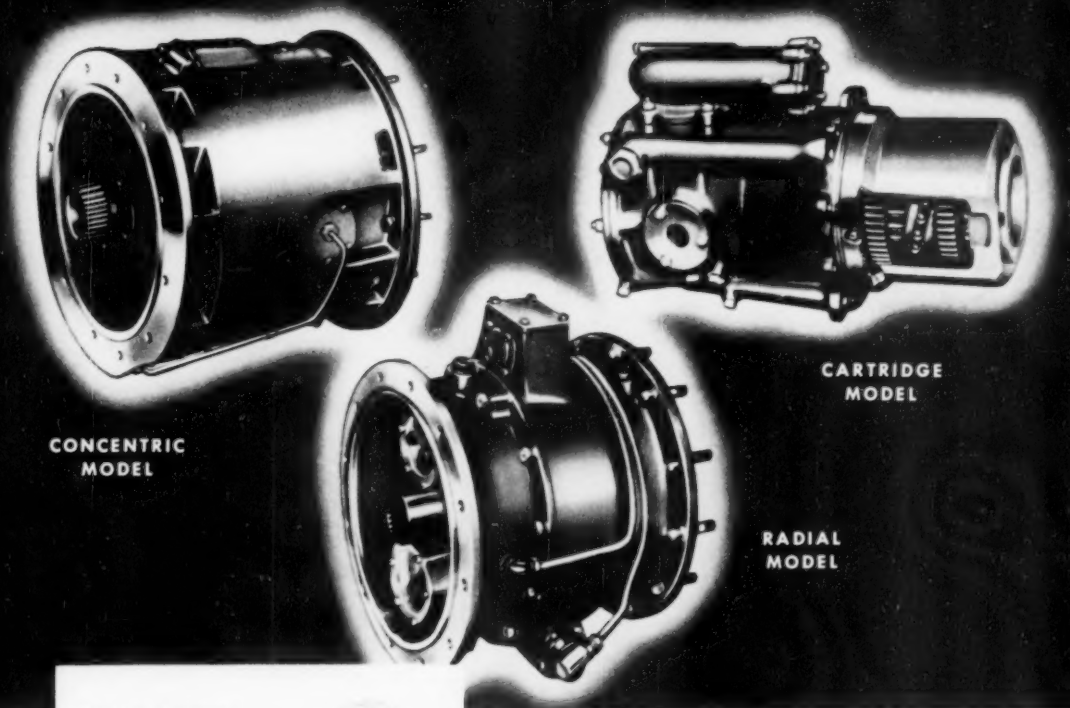
Introducing the COUGAR . . . New Navy Jet Fighter

The F9F-6 COUGAR is a sleek, swept wing successor to the battle-proved Grumman PANTHER, the first jet used in combat by our Navy. Much faster than the "over 600 mph" PANTHER, the new COUGAR has the same low landing and take-off speed. This difficult performance combination is ideal for carrier and front line operations by Navy and Marine Corps pilots.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, LONG ISLAND, N. Y.

Contractors to the Armed Forces

SUNDSTRAND "INTEGRAL TYPE" CONSTANT SPEED DRIVES



. . . as applied to jet engines!

Now being applied, or under consideration for various jet engines, are these three models of Sundstrand "Integral Type" Constant Speed Drives. Since the main engine houses this type of drive, the drive itself is more compact, of lighter weight. Engine oil is used, eliminating a separate oil system. Installation and maintenance are simplified as the alternator is easily bolted to or removed from the constant speed engine pad. Higher efficiency is maintained, even at extremely high altitudes. The precision units, driven by power extracted from the engine shaft, are permitted less than ± 2 cycle frequency variation on 400 cycle output. They are a direct result of Sundstrand's *reliable* research, *expert* engineering, and *precision* production.

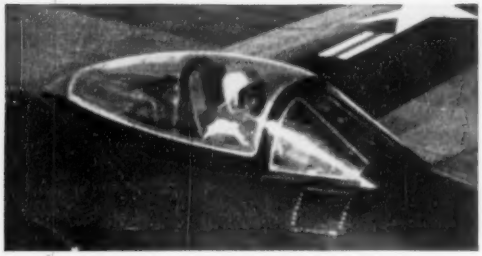
SUNDSTRAND

SUNDSTRAND AIRCRAFT HYDRAULICS

SUNDSTRAND MACHINE TOOL CO.
HYDRAULIC DIVISION, ROCKFORD, ILL.

AIRCRAFT AND INDUSTRIAL HYDRAULIC TRANSMISSIONS, PUMPS, MOTORS, AND VALVES • OIL BURNER PUMPS • AIR SANDERS
LATHES • MILLING, BROACHING AND SPECIAL MACHINES • BROACHING TOOLS • MAGNETIC CHUCKS

B.F.Goodrich



How rubber got the bugs out of a "greenhouse"

ALTITUDES of 8 miles or more used to spell trouble for a plane's "greenhouse"—the pressurized plexiglass canopy that fits over the cockpit. The inflatable seal between the greenhouse and cockpit would sometimes burst from the effects of low pressure on the outside, high pressure on the inside, letting the air inside the greenhouse rush out.

B. F. Goodrich engineers, called on by the manufacturers, studied the problem. A really effective inflatable seal, they figured, should blow up like a paper bag instead of like a balloon—easier and with lower, safer pressures. Here's how they made a seal that would work that way: They took a special fabric, rubber-coated on both sides, and vulcanized it in collapsed position to a flexible rubber base. Inflated, the rubberized fabric simply lifted to sealing position with little or no stretching. Sealing was practically instantaneous, with pressure only a few pounds above that inside the canopy. Furthermore, it would inflate with less pressure at minus 65° than old-type seals required at room temperatures.

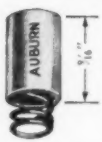
The new seal has other advantages, too. It has more resistance to wear and damage than ordinary seals. It fits complex curves better. It seals and unseals faster. Sliding wear and scuffing are minimized.

The new B. F. Goodrich seal is now used on more than a dozen makes of planes, including the three jets above: North American Sabre, top; McDonnell Banshee, bottom left; Northrop Scorpion, bottom right. This new type of seal is one of many aviation developments that have come from BFG, leader in rubber research and engineering. Other B. F. Goodrich products for aviation include tires, wheels and brakes; heated rubber; De-Icers; Avtrim; Plastilock adhesives; Pressure Sealing Zippers; fuel cells; Rivnuts; accessories. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich
FIRST IN RUBBER

Auburn SPARK PLUG CONNECTORS

for aircraft



for 7 mm cable
1041-C Steatite
1041-M Mycalex
1041-D Alumina
(AN 4164-2)

for 7 mm cable
1099-C Steatite
1099-M Mycalex
1099-F Phenolic
1099-D Alumina
(AN 4164-1)

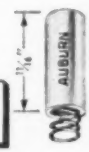
9/16" and 1" sleeves only, without springs, are also available

TERMINAL COLLARS
1042 Neoprene
1043 Silicone
Used with all ⅝" connectors on 7 mm cable

for military trucks and tanks

for 5 mm cable
SP420 Steatite
CC4025 Mycalex
CC4006 Alumina

for 5 mm cable
CC4017 Steatite
CC4020 Mycalex
CC4013 Alumina



9/16" and 11/16" sleeves only, without springs, are also available

Neoprene or Silicone Grommets
AD51-960
Used with all 11/16" connectors on 5 mm cable

AD50-894
Used with all 9/16" connectors on 5 mm cable

AA50-313
Spring Assembly
Used with all 9/16" and 11/16" connectors for 5 mm cable

AUBURN SPARK PLUG
Co. Inc., Auburn, N.Y.

Aviation Week

ABP Member ABC

Volume 56 — March 24, 1952 — Number 12

Headline News

Reports Underline Production Crisis.. 13
Hot-Rod Jets 14
ATA Pushes Airborne Radar..... 15
Fare Fight 15
UAC Reports 15
Curtiss-Wright Faces Busy Year..... 16
NYA Wins 16
New Indictments in AF Irregularities.. 17
New Intercept 17

Financial

Martin Illustrates Aviation Risks..... 18

Aeronautical Engineering

Britannia Nears Final Assembly..... 21
Royal Navy Tests Steam Catapults.... 32

Avionics

IRE Talks Point to Weight Saving.... 35

Production

Convair 340 on the Line..... 52

Equipment

How New Fuel Tank Sealer Works.... 61

Air Transport

Airlines Test CAB Life-Death Power. 80
PanAm Shows Its Ocean Coach..... 81
CAB Sets Causes of Crash-Landing... 82
82 New Transports Approved by ACC. 82
Beckworth vs. PAD on Aviation Gas. 84

Editorials

How Business Men View OAS..... 92
Can Hensley & Davis Answer?..... 94

Departments

News Digest 7
Aviation Calendar 8
Picture Page 9
Who's Where 11
Industry Observer 11
Washington Roundup 12
Thrust & Drag 29
Production Briefing 56
Contracts 58
Letters 73

Shortlines 85

40,692 copies of this issue printed

Robert H. Wood
EDITOR

Merlin H. Mickel..... MANAGING EDITOR

William Kroger..... Assistant Managing Editor
Alexander McSurely..... Assistant Managing Editor
Ben Lee..... Military Editor
G. L. Christian III..... Equipment & Maintenance
David A. Anderton..... Engineering Editor
F. Lee Moore..... Transport
Katherine Johnsen..... Congress
Philip Klass..... Avionics
Henry Lefer..... News Desk
A. W. Bentz..... News Desk
Scott H. Reiniger..... Editorial Assistant
Victoria Giaculli..... Editorial Assistant
Erwin J. Bulban..... Special Assignments
Leo T. Tarpey..... Editorial Makeup

Editorial Offices: 330 West 42nd St., New York 36, N. Y., Phone Longacre 4-3000, or (night) 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

Domestic News Bureaus: Atlanta 3, 1321 Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 17, 1111 Wilshire Blvd.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents* in more than 60 major cities.

Foreign News Bureaus: London, Paris, Frankfurt, Tokyo, Bombay, Melbourne, Rio de Janeiro, Mexico City. *Correspondents* in more than 59 major cities.

Aviation Week is served by PRESS ASSOCIATION, INC., a subsidiary of Associated Press.

Robert F. Boger
PUBLISHER

R. W. Martin, Jr., *Advertising Sales Manager;* J. G. Johnson, *Business Manager;* Mary Kiernan, *Research and Marketing;* Sales Representatives: J. C. Anthony, New York; H. P. Johnson, Cleveland; L. J. Biel, Chicago; W. E. Donnell, St. Louis; E. P. Blanchard, Jr., Boston; James Cash Dallas; R. C. Maulsby, Atlanta; R. F. Dorland, Jr., San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Philadelphia, Detroit, London.

March 24, 1952 — AVIATION WEEK — Vol. 56—No. 12

Member ABC and ABP

Published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. Publication Office: 99-129 North Broadway, Albany 1, N. Y.

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.

Subscriptions: Address correspondence to AVIATION WEEK—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 36, N. Y. Allow ten days for change of address.

Please indicate position and company connection on all subscription orders.

Subscription rates—United States and possessions, $6 a year; $9 for two years; $12 for three years. Canada, $8 a year; $12 for two years; $16 for three years; payable in Canadian currency at par. Pan American countries, $10 a year; $16 for two years; $20 for three years. All other countries $20 a year; $30 for two years; $40 for three years. Entered as second-class matter, July 16, 1947, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A.

Copyright, 1952 by McGraw-Hill Publishing Co., Inc. All Rights Reserved. Cable address: "McGraw Hill New York." Publications combined with AVIATION WEEK are AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

BARBER COLMAN

7 YEARS

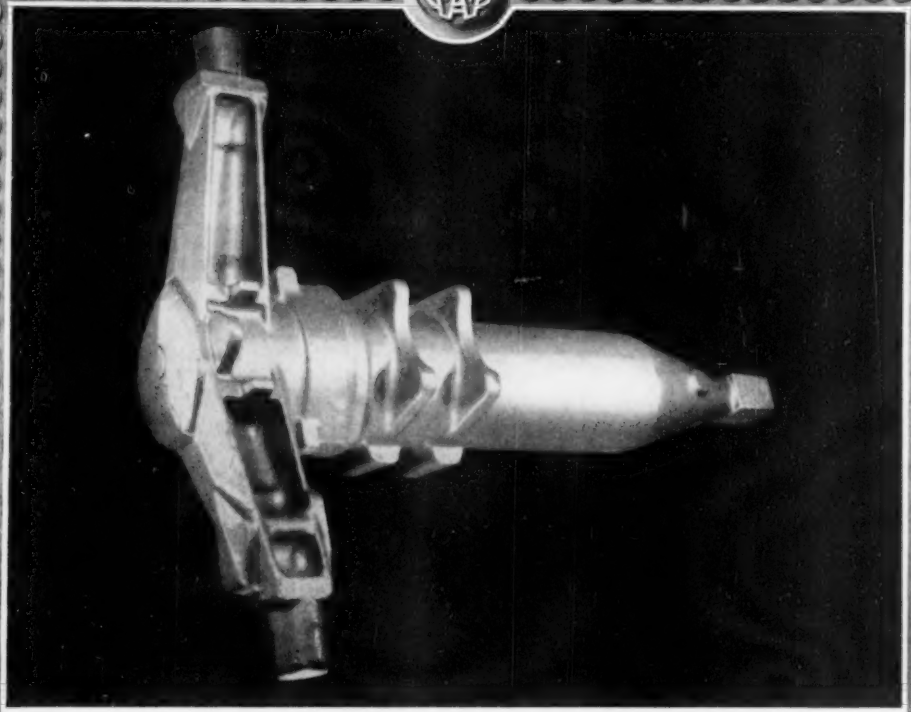
FAFNIR

On Lockheed Constellations, Douglas DC-6s, Martin 202s and 404s, Consolidated 240s and many other commercial and military aircraft, Barber-Colman Actuators are standard equipment. For over 7 years Fafnir Ball Bearings have been standard equipment on these actuators . . . designed for extreme temperature, high altitude aircraft applications. Something more than just good ball bearings accounts for this accepted procedure. It's the Fafnir attitude and aptitude . . . a way of looking at ball bearings from the user's viewpoint, an aptitude gained from more than forty years' specialization in the manufacture of ball bearings. The Fafnir Bearing Company, New Britain, Conn.

Fafnir Extra-Small Bearing, one of the Fafnir Ball Bearings regularly specified for Barber-Colman Aircraft Actuators. These precision-made bearings are available

with various combinations of shields and seals . . . metric and inch types.

Illustration of bearing is twice size



Forgings for the aircraft industry today demand the utmost in engineering and production techniques and in scientific laboratory control. This massive complicated landing gear component, weighing over 400 pounds, is typical of Wyman-Gordon's forging contribution to the ever-growing progress in aircraft design. In crankshafts for the automotive industry and in all types of aircraft forgings, steel and light alloy, Wyman-Gordon has pioneered in the development of forging "know-how"—there is no substitute for Wyman-Gordon experience.

Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL

WORCESTER, MASSACHUSETTS

HARVEY, ILLINOIS DETROIT, MICHIGAN

NEWS DIGEST

DOMESTIC

Grumman XF10F-1 Jaguar is scheduled to begin flight tests at Edwards AFB, Calif., within the next few weeks. The big fighter with variable swept wings is powered by a Westinghouse J40 jet engine in the 9,000-lb.-thrust class.

Trans-Atlantic freight record, westbound, for Douglas DC-4s, is claimed by Seaboard & Western Airlines for one of its planes, which carried 16,014 lb. of general cargo from Germany to New York, Mar. 9-10. Last summer an S&W DC-4 hauled a record 16,616 lb. eastbound.

Donald A. Duff has resigned as executive vice president-general manager of Colonial Airlines. Reports are that the post will remain vacant. Duff, formerly vice president of Frontier Airlines, joined Colonial on Jan. 9, 1952.

Continental Charters fatal crash at Little Valley, N. Y., last Dec. 29 was probably caused by the "captain's poor judgment in attempting a flight by visual reference during instrument weather conditions," CAB finds in its accident investigation report.

Aircraft, engine and prop backlogs totaled $12,128 million as of Dec. 31, 1951. This is a 9% increase as of Sept. 30 and a 141% hike over orders on hand at the end of 1950. Complete aircraft and parts orders represented 68% of the Dec. 31, 1951, backlog.

Doman YH-31 has been ordered in service test quantity for Army Field Forces. The YH-31 is the military version of the LZ-5, can carry six on short hauls.

Shipment of 196 personal and executive planes (1-10 places) was made by six firms in January, with $1,573,000 total value, manufacturer's net billing price.

Samuel D. Wiley, 57, inventor of the Wiley Emergency Landing Flare, died in St. Petersburg, Fla., Mar. 12.

Hiller Helicopters has been granted Production Certificate 607 by CAA, permitting the firm to certificate its own craft as they come off the line. Covered are Hiller UH12, UH12A and UH12B.

United Air Lines fatal crash at Oakland 1st Aug. 24 was probably caused by "failure of the captain to adhere to instrument procedures . . . on the approach to the Oakland Municipal Airport," according to CAB accident analysis.

FINANCIAL

Lear, Inc., reports net earnings, after taxes, of $803,630 on sales of $21 million for the year ended Dec. 31, 1951. Earnings before taxes were $1.7 million. Backlog as of Mar. 1 was $41.9 million.

Bendix Aviation Corp. had sales of $341 million for the year ended Sept. 30, 1951. Earnings were $11.8 million, down more than $5 million from the previous year. Total taxes were over $25 million. Aviation products sales totaled 57% of all sales.

Republic Aviation Corp., Farmingdale, N. Y., has arranged a $10-million line of credit with Chase National Bank of New York to provide working capital for increased production.

Kaman Aircraft Corp., Windsor Locks, Conn., had net earnings of $26,866 for the year ended Dec. 31, 1951, on income of $4,831,805. Kaman's backlog is over $25 million.

Chicago & Southern Air Lines had operating revenues of $16,236,930 in 1951, with net income after taxes being $1,130,959.

United Air Lines reports net income after taxes for 1951 as $8,563,097, highest in UAL's history. Taxes were over $11 million. Operating revenues reached a new high, $127,797,794.

Continental Air Lines had net income of $383,848 (after taxes) for 1951 on total operating revenues of $8,120,974 for year ended Dec. 31, 1951.

Ryan Aeronautical Corp. reports gross revenue of $6 million for first quarter of fiscal 1952, ended Jan. 31, with sales volume 61% above that for same period last year.

Solar Aircraft Co., San Diego, has filed with Securities and Exchange Commission its plan to issue 120,000 shares of common stock. The company had 456,516 shares outstanding on Jan. 31.

INTERNATIONAL

Air Chief Marshal L. S. Breadner, 58, former Canadian Chief of Air Staff and commander of the RCAF during World War II, died Mar. 14. He learned to fly at Dayton, Ohio, in 1915.

Consult your 1952 I.A.S. "Aeronautical Engineering Catalog"

for complete information on AIRBORNE'S

ROTORette — LINEATOR — ROTORAC & TRIM-TROL ELECTRO-MECHANICAL ACTUATORS. Also ANGLgear RIGHT-ANGLE BEVEL GEAR UNITS.

AIRBORNE
ACCESSORIES CORPORATION
1414 Chestnut Avenue
Hillside 5, New Jersey
A.A.C.

Guns... on the double!

Chase Assault Transports – the only planes capable of delivering heavy equipment to forward combat areas by ***landing in unprepared fields.***

APPROVED AND ACCEPTED BY U.S.A.F.

Exercise "Southern Pine" demonstrated this remarkable achievement, which replaces – as the primary means of delivery – the costly uncertain techniques developed for interim use.

No time penalty, no weight penalty, no loss from chute malfunction or impact damage. Guns and vehicles are driven out of Assault Transports – intact, clean and ready for immediate service.

Chase AIRCRAFT CO., Inc.
WEST TRENTON, NEW JERSEY

STROUKOFF AVITRUC

AVIATION CALENDAR

Mar. 24-26—American Society of Mechanical Engineers spring meeting, University of Washington, Seattle.

Mar. 30-Apr. 3—Convention of American Association of Airport Executives, Ft. Worth.

Mar. 31—Technical Societies Council of N. J. annual conference; panels on metal working and quality control; Essex House, Newark, N. J.

Mar. 31-Apr. 1—First annual Agricultural Aviation Conference, sponsored by Texas Aeronautics Commission, Texas Flying Farmers, and the A&M College System; at A&M College of Texas, College Station.

Apr. 1-4—22d annual Greater New York Safety Convention & Exposition, Hotels Statler and New Yorker, New York.

Apr. 3—Conference on safety problems of aviation, in conjunction with 22d annual Safety Convention of Greater New York Safety Council; Col. Gilbert E. Teal, USAF, will preside; Hotel Statler, New York.

Apr. 9-11—Society of the Plastics Industry seventh annual technical session, reinforced plastics division, Edgewater Beach Hotel, Chicago.

Apr. 15-17—American Institute of Electrical Engineers southwest district meeting, Hotel Jefferson, St. Louis; aviation papers Apr. 15-16.

Apr. 15-18—International Federation of Airline Pilots' Assns. annual convention, Sydney, Australia.

Apr. 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

Apr. 22—Institute of the Aeronautical Sciences meeting, Cleveland-Akron section, Cleveland.

Apr. 28—International Air Transport Assn. Warsaw Convention special committee meeting, Bermuda.

Apr. 30-May 2—American Institute of Electrical Engineers northeastern district meeting, Arlington Hotel, Binghamton, N. Y.; aviation papers Apr. 30.

May 2-4—Sixth annual Intercollegiate Air Meet, Great Barrington, Mass.

May 8-9—Fifth annual Wisconsin Aeronautics Conference, Green Bay.

May 11—International Air Transport Assn. traffic committee meeting, Buenos Aires.

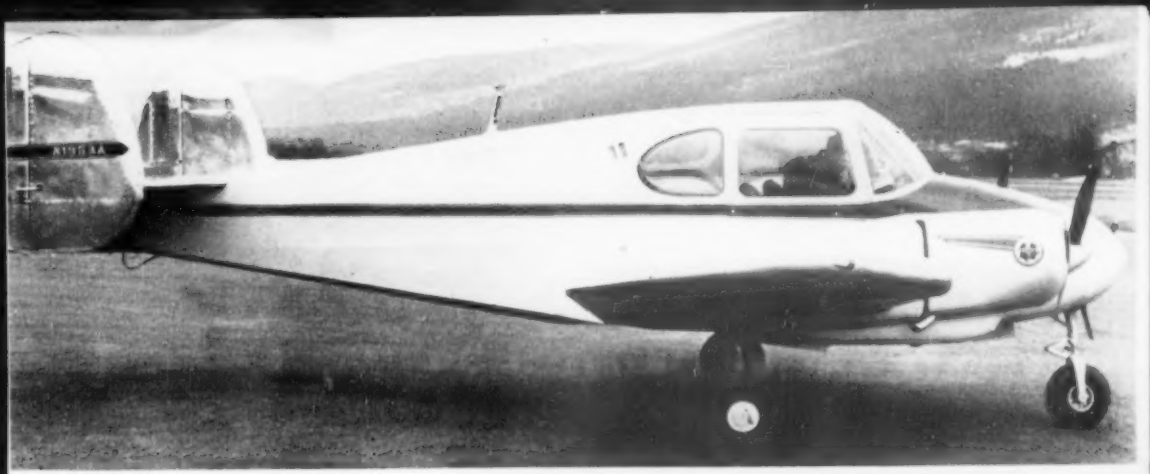
May 12-14—National conference on airborne electronics, co-sponsored by Institute of Radio Engineers' Dayton section and Professional Group on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio.

May 19—International Air Transport Assn. technical committee and medical committee meetings, Copenhagen.

May 21—International Air Transport Assn. financial committee meeting, Rome, Italy.

PICTURE CREDITS

9—(Piper) Piper Aircraft; (Sipa S. 200, Bristol Sycamore) McGraw-Hill World News; 16—North American; 21, 22—McGraw-Hill World News; 35—(top) Lockheed; 36—(top) U. S. Army; 52, 53—Convair; 61—Rohr Aircraft Corp.; 81—PAA.



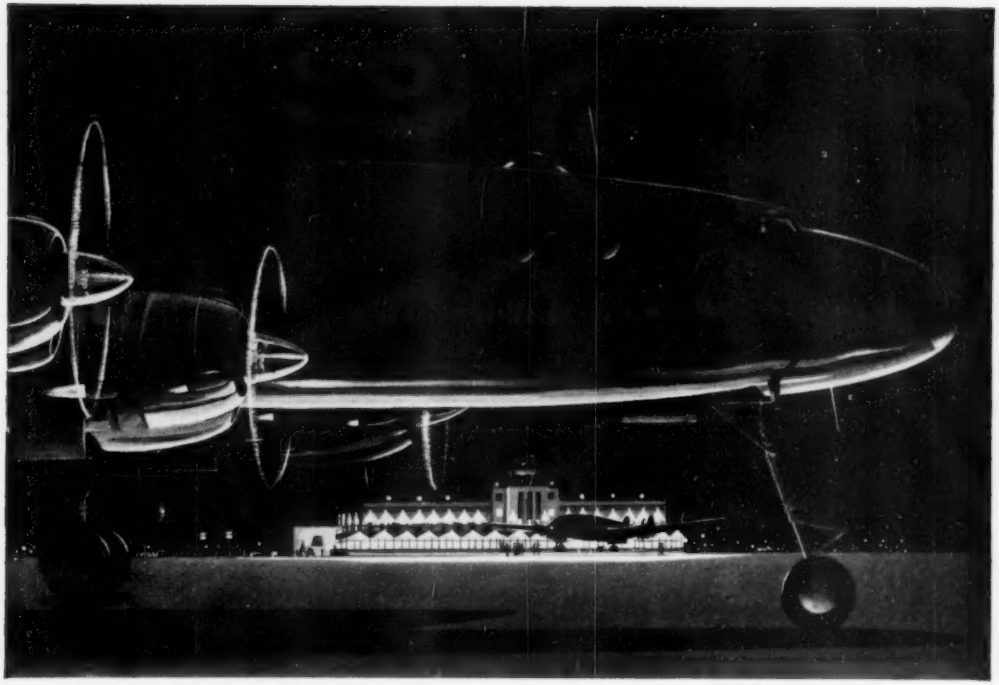
PIPER TRANSPORT—First photo (above) shows new Piper PA-23 Twin-Stinson low-wing four-place light transport powered by two 135-hp. Lycoming O-290-D2 engines, which began its flight test program Mar. 2. It's designed to sell for less than $25,000 (Aviation Week Mar. 3, p. 16).

The Week's Picture News

NEW BLACKBURN FREIGHTER—Model (right) of latest Mk. 2 version of Blackburn's Universal Freighter, which features a revised rear fuselage. Ministry of Supply has ordered a prototype. Mk. 2's payload is 20 tons.

FRENCH LIGHT JET—Tiny SIPA S.200 prototype (left), powered by a 330-lb.-thrust Turbomeca Palas turbojet, is checked during its test program. It seats one, weighs only 869 lb. empty, has 23 ft. 6 in. span.

COPTER FOR COASTAL COMMAND—Bristol Sycamore (below) in RAF Coastal Command markings prior to undergoing flight evaluation trials.

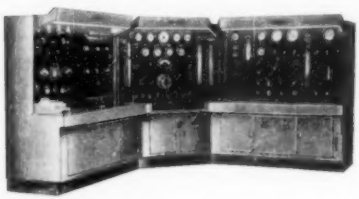


"Flight 236...flight 236...clear for take-off"

With a roar of engines, the huge airliner hurtles down the runway and leaves the ground. Wheels retract, seat belts are unfastened, passengers relax comfortably and *safely* as the plane speeds through the night. The airlines have a remarkable record for passenger-mile safety, and they mean to keep it. We at Greer are privileged to help them. It is very likely that the plane above was checked and put into flying order with the use of Greer test and maintenance equipment.

Greer equipment makes many testing operations entirely automatic. There is no possibility for error; the human element has been replaced with the absolute dependability of precision equipment, famous for simple, rapid, *accurate* operation.

In addition to standard models, many special machines have been developed to meet specific testing requirements. A staff of *creative engineers* is always available for a discussion of out-of-ordinary problems. There is neither cost nor obligation in meeting with us at your convenience. Write or call.



Another Example of Creative Engineering from Greer. The Servicenter shown above is a complete test shop for all aircraft accessories for all systems. It's Greer's answer for the wide variety of jobs encountered in maintenance shops of major airline terminals and independent installations.

GREER
TEST EQUIPMENT

GREER HYDRAULICS INC. · 458 EIGHTEENTH STREET · BROOKLYN 15, NEW YORK

Field Offices. 298 Commerce Bldg., Dayton • 2502 E. Grand Blvd., Detroit • **Representatives.** [illegible]

WHO'S WHERE

In the Front Office

John Jay Hopkins has been named managing director of Canadair, Ltd., in addition to his other posts which include chairman of the board and president of Electric Boat Co. He is also chairman of the board of Canadair. **Rear Adm. Lawrence B. Richardson, USN (Ret.),** has been appointed to the newly created office of vice chairman of Canadair and made a member of the subsidiary's executive committee. **J. Geoffrey Notman** has been elected president and general manager of Canadair. He formerly was senior vice president of the Canadair organization.

Changes

J. B. Cooper has been named to represent the engineering department of AiResearch Manufacturing Co. of Phoenix, Arizona, at AiResearch's Los Angeles plant. **Russell D. Clarke** has been appointed to represent the company's systems and procedures department which is located at Phoenix.

Charles R. Skinner, formerly assistant to the purchasing manager, has been made purchasing agent of raw materials for Pratt & Whitney Aircraft.

Arthur L. Dow, for ten years hydraulic engineer with Chance Vought, has joined Pacific division of Bendix Aviation Corp., North Hollywood, Calif., as sales engineer for the Dallas area.

Stanley T. Rader has been transferred from Convair-Ft. Worth to head the company's new Detroit district office and **William A. Goodman,** who handled outside vendor contacts for Convair in 1942-1948, has been placed in charge of the Los Angeles district office. **Russell D. O'Neal,** director of the University of Michigan's Willow Run research center, has been named assistant division manager in charge of projects at Convair-Ft. Worth.

L. B. Littrell has been appointed production manager for Pacific Automotive Corp., Burbank, and **C. D. (Tex) McQuay** has been appointed as manager, Engine division, Burbank.

R. V. Carleton has been designated operations manager of Braniff International Airways. He had been flight operations director for Braniff Airways since 1947.

J. A. Butcher has been designated manager of aircraft engineering for Northwest Airlines, succeeding Don O. Benson, resigned. **C. G. Magnuson** has been made superintendent of overhaul at NWA's overhaul base in St. Paul. **L. E. Koerner** has been named manager of the maintenance division operations department, succeeding **E. B. Curry,** resigned.

Sherman S. Graves has been designated general manager of Cessna Aircraft Co.'s new Helicopter division, formed following purchase of Seibel Helicopter Co., Wichita. Charles Seibel, former head of the copter concern, is chief engineer of the new division. (For additional information about Cessna, see p. 57.)

INDUSTRY OBSERVER

► Allison's Convair Turboliner has now logged 53½ hours flight time. The plane, now at Edwards AFB, Muroc, Calif., is undergoing routine 50-hr. check of the two Allison 501-B2 turboprop engines. The engines each develop 3,000 eshp., and are prototypes of Allison's T-38 engine development. Following engine check the Turboliner will make two more test flights at Edwards and then return to Indianapolis early in April.

► Airwork, Ltd., and Bristol Aeroplane Co., Ltd., have been named by Canadair, Montreal, as British contractors for repair, overhaul and maintenance of Royal Canadian Air Force F-86 Sabre fighters in England. By the end of 1951, Canadair had produced 200 F-86s.

► Fourth prototype of Rene LeDuc 021 experimental ramjet-powered monoplane is now in manufacture and is expected to make its first flight by end of 1952. This latest two-place interceptor research plane is the first of the series capable of taking off under its own power; previous models have been air-launched from the back of an SE-161. Takeoff power is derived from two Turbomeca Marbore II jet engines—one in either wingtip. Air intake duct in nose is enlarged to 8 ft. in diameter. The 021 performance specifications call for fuel capacity for 45 min. flight and a service ceiling of 49,200 ft. Speed of the 021 is subsonic but reports are that a fifth prototype now on drawing boards contemplates a supersonic development.

► Marcel Dassault is flight testing its MD-450-301, which differs from standard MD-450s in having jet engine intakes alongside cockpit instead of in the nose. The modified MD-450 is an aerodynamic prototype for the two seat MD-453 all weather fighter which will have a radar nose.

► Prime difference between McDonnell XF-88A and production prototype YF-101 will be lengthening of fuselage from 54 ft. 1 in. to approximately 80 ft. Increase in fuselage length is required to accommodate extra fuel tanks and electronic gear to enable it to meet USAF escort requirements. Other manufacturers who have increased the length of aircraft so greatly have had to contend with new lateral stability problems.

► Marine Corps in Korea is employing Sikorsky HRS helicopters on anti-sniper missions which they have dubbed "Operation Rabbit Hunt". Marines load the copters with a number of expert riflemen and hover over the battlelines. If an enemy sniper is located by the helicopters or reported by radio from forward controllers he's quickly dispatched by the airborne rifleman.

► Air Force officials are eyeing a plush Convair 240 No. N-927 quietly rusting away at Los Angeles Airport. The plane, formerly for use by Convair executives between San Diego and Ft. Worth, was leased almost two years ago by Howard Hughes at a monthly rental of $7,000. Both Air Force and Convair have an immediate need for an executive transport but plane is held by Hughes by virtue of a contract omission which failed to specify termination clause.

► Pan American Airways has become the first U. S. airline to buy Sperry Zero Readers for a fleet installation. PAA's 39 DC-6Bs will carry the approach aid. In addition to the PAA installation, Sperry Gyroscope Co. has sold the Zero Reader to Continental Air Lines for its forthcoming Convair 340s. That will be only the second U. S. airline customer, but foreign carriers are continuing to show real interest in the Reader. South African Airways and KLM ordered months ago, now British Overseas Airways is planning the instrument for its Comets, British European Airways for its Viscounts. Other customers aboard are Air France and Sabena.

► Saab Aircraft Co., Sweden, is putting the finishing touches on a new transonic windtunnel with power supplied by four DH Goblin turbojets. Test section dimensions can be varied from 3.3 × 2.3 ft. for subsonic work to 2.3 × 2.3 ft. for supersonic tests.

Washington Roundup

Stretching the Stretchout

Congress appears inclined to make a substantial cut in funds for the air power program but to call it by another name: "conversion to contract authority."

Administration has approved $11 billion for USAF plane and related procurement and $3.2 billion for BuAer plane procurement for the 1953 fiscal year which starts July 1.

Members who want to cut the budgets are pained at the thought of being criticized for holding down air power.

So, Sen. Blair Moody proposes a round-about method that's been seconded by USAF Undersecretary Roswell Gilpatric and is getting serious consideration. This would convert $3.5 billion of Air Force's 1953 funds and $960 million of BuAer's to contract authority. This is the amount that won't actually be "spent" over the year.

Moody comments: "I assure you the budgets are going to be cut. This way Congress could cut the funds and still there would be no letup in the air program."

Military observers don't agree. They look on the proposal as a further stretchout.

Since the Korean war, USAF and BuAer have been permitted by the Secretary of Defense to enter into contracts exceeding their appropriations. For example, USAF is entering into plane contracts totaling $2.8 billion more than the $11.3 billion cash it was appropriated for procurement in the current 1952 fiscal year. This is called "partial financing."

But under Moody's plan for a return to total financing, USAF would have had to buck the Administration and Congress, both growing increasingly tight with defense money, for the entire $14.1 billion—$11.3 billion cash and $2.8 billion contract authority.

Prospect is that a ceiling will be clamped on air power money for the fiscal 1954 year by whatever administration is in power. If $3.5 billion of USAF's allowance in 1953 is contract authority, instead of cash, this amount will have to be financed from funds under the 1954 ceiling. It will add up to a smaller 1954 program.

'Mixed' Production

You can expect USAF and BuAer to push their program for "mixed" production. Under this plan, at least two companies make the same aircraft or engine; the plan also provides that one company make models for both services.

The objective is to acquire cost comparisons.

BuAer's assistant chief, Rear Adm. John Moss, reported this progress to a Senate committee:

At the McDonnell Aircraft plant in St. Louis, USAF F-101 line is alongside Navy's F3H line. At the North American Aviation Columbus plant, Navy's FJ-2 shipboard fighter line is next to USAF's F-86 line. Negotiations are now in progress for parallel production of Navy's A3D and USAF's B-66 in the Chicago plant of Douglas, and for production of McDonnell's F3H at the Texas Engineering and Manufacturing Co. plant at Dallas.

Vinson's New Stand

Rep. Carl Vinson, chairman of House Armed Services Committee, who lost the popular title of "admiral" when he became a leading advocate of long-range land-based bombing after World War II, has a revised slant on strategy.

His comment, after a session with Navy men, on the proposal for a second 60,000-ton carrier comparable to the Forrestal now under construction:

The flush deck flattops "will give the U. S. a second string for its 'Sunday Punch'—strategic atomic bombing. In the event of a war with Russia, the Soviets would know where our land bases for strategic bombers are located and would try to knock them out. The big new carriers will give us movable bases that any enemy could not find."

Finletter Tightens the Reins

There are signs of tighter control over Air Force policy by Secretary Thomas K. Finletter. He has:

- **Taken Office of "Public Relations"** from under USAF Chief of Staff Gen. Hoyt Vandenberg;
- **Renamed it** the "Office of Public Information";
- **Reduced its strength** from 52 officers and 34 civilians to 19 officers and 15 civilians, increasing the proportion of civilian representation;
- **Announced his belief** that "the civilian secretaries should assume more responsibility for representing the department to the public instead of leaving the job to a large public relations staff."

(Navy's information unit is under Secretary Dan Kimball, but Army's is under Chief of Staff Gen. J. Lawton Collins. Both services call their organizations "Office of Information.")

Services have been under Congressional fire for spending too much on public activities.

'Brickbats' and 'Cuecups'

The ball is rolling, but slowly, on a system of priorities for machine tools. All told, 70% of production goes to the military.

- **"Brickbat"** is the code name for the top category. Each service has four projects in this category. These twelve projects all have the same priority. Tools for "Brickbat" projects are getting the "urgency treatment."
- **"Cuecup"** is the other priority category. It includes some 250 military projects. USAF has projects one, four, seven, etc. on the "Cuecup" list; Army has projects two, five, eight, etc.; and Navy, three, six, nine, etc.

The order of "priority," according to USAF's Undersecretary Gilpatric, was decided by coin flipping. It doesn't yet mean much—all have the same priority.

But Congress is bringing pressure on the Pentagon to set up an order of priority.

Gilpatric agrees with the congressmen, "It ought to work, as you have indicated, mainly that item No. " should get priority over item No. 97, but that has not been done."

Munitions Board Chairman John Small discounted the coin-flipping report and complained to a Senate committee: "The Air Force wanted everything they had in the top category. If everything is urgent, nothing is urgent."

Gilpatric blamed the military for the delay in getting on with a priority system, and praised Defense Mobilizer Charles Wilson and Aircraft Production Board Chairman Harold Boyer for "putting the steam under the Defense Department."

—Katherine Johnsen

AVIATION WEEK MARCH 24, 1952
VOL. 56, NO. 12

New Reports Underline Production Crisis

- **Jet engine forecast indicates top limit of 7,500 jet planes a year; Finletter warns of drain on AF.**
- **Congressional committee scores "lack of urgency" on the part of defense mobilization officials.**
- **But Defense Secretary Lovett says nation is stronger and that buildup program is progressing.**

The stretchout of military aircraft production was being presented to the Defense Department last week in a way that indicated a gathering crisis.

Secretary Robert Lovett in his semi-annual report found the U. S. stronger and the defense production buildup progressing. But at the same time his department was studying two pointed warnings:

• **A confidential report** that mentioned that only 90,000 jet engines will be produced between now and the end of 1955 because of the $52 billion ceiling on defense appropriations in fiscal 1953.

Observers familiar with industry statistics calculate from that figure that production of jet aircraft in the same period cannot be more than 30,000, and perhaps as low as 20,000. This would be an average of no more than 7,500 jet planes a year.

• **A memorandum** from Air Secretary Finletter that the drain on USAF resources by the Korean war has affected the Air Force's ability to continue to build up to 95 wings and to put forces into other strategic areas.

The crisis in defense production was also recognized by the Senate Preparedness Committee of Lyndon Johnson. In its annual report, the committee charged administrative agencies with "apathy" toward the defense buildup. Those directing the program, it said, "lack the sense of urgency that has previously goaded Americans into their tremendous preparedness achievements."

Chairman Johnson said that concern of the committee is based "upon the facts and figures in our files covering American production of the munitions of war." He added: "The committee is giving the highest priority to investigations of bottlenecks which have impeded the output of fighting equipment. First of these investigations is the one on aircraft upon which we will hold hearings in the next few weeks.

▶ **Lack of Urgency**—One common denominator is found in all the reasons, explanations and excuses for lagging aircraft and other defense production, the Johnson committee reports: "the lack of a sense of urgency" by Washington's defense mobilization officials.

The committee's report continues:

"**On every hand the slogan of mobilization planners appears to be: 'Don't disturb the civilian economy.' The resultant mobilization program is one which in almost every instance has adapted the needs of defense to the civilian economy instead of adapting the civilian economy to the needs of defense.**

"The objective has been ample supplies of both butter and guns. The result has been a small number of guns and a great amount of butter with a considerable number of lollipops thrown in."

▶ **The Finger Points**—No names are named. But the committee's severe criticism of the "mobilization planners" and "the military men" appears pointed at the administrations (among others) of Defense Mobilization Director Charles Wilson and USAF Chief of Staff Gen. Hoyt Vandenberg.

The committee's view of the two categories might be summarized:

• **Civilian mobilization agencies.** Nursing the civilian economy, they fail to give adequate consideration to a fast buildup of the nation's military might. "The committee has been deeply concerned over the lack of perspective as to the great danger that confronts this nation."

• **The military.** Restricting their outlook, they consider only the necessity of building up a strong defense, with the result that from the business point of view the armed services are sloppily run propositions. (The committee has previously issued several critical reports on USAF wastage of manpower and money. These are summarized in the annual report to illustrate its criticism of the service's lack of "cost consciousness.")

"What the committee is seeking to do is to erase from the minds of the military men the fallacious idea that the nation's economic struggle is no concern of theirs. They must be made to realize that every member of the military establishment should appoint himself a committee of one to protect and preserve the nation's enormous investment in weapons and fighting equipment. . . .

"Some way will have to be found to inculcate into our men in uniform the fundamental concepts of sound business practice. Only then can our preparedness program be placed on a footing which will guarantee this nation military security without economic collapse."

▶ **Secretaries Praised**—There's praise for one stratum of defense officialdom: the civilian secretaries of the armed services.

The committee's comment on them: "men of integrity, loyalty, and ability. We have found in them an awareness of the awesome responsibilities that have been laid upon their shoulders. We have also found them to be men who can accept criticism as an instrument necessary to the running of any vast enterprise."

The committee deplores "the failure . . . to find and bring to Washington the top-flight operators—the engineering, the operating, the production men—so vitally needed for a successful defense program. It is expressed in the inability of defense mobilizers to fill the key administrative jobs with the best managerial talent and personnel men.

"It is significant that three different men have held the top government spot in aircraft procurement since the outbreak of the Korean war. It is significant that far too many production jobs are filled by men lacking experience instead of by men who cut their teeth on a production line."

▶ **Lovett Report**—Chances for a successful surprise attack by the Communists against the free world have dimmed considerably during the last year, Defense Secretary Robert A. Lovett told President Truman in his semi-annual report last week.

Lovett stated that the United States and the other free nations, although still in the buildup stages, are stronger today than at any time during the last five years.

Within the United States, the prog-

ress in defense buildup is reflected by the increase from 8% to 14% within a year of the proportion of "the gross national product" that is being utilized for security programs.

"Deliveries of weapons and equipment to the armed forces in December, 1951, were made at the rate of nearly $2 billion a month," Lovett said. This is about five times the rate at the beginning of the Korean conflict.

The schedules for 1952 call for nearly doubling the 1951 year-end delivery rate with anticipation that between 17% and 18% of the national output in 1952 will be devoted to security.

▶**Defense Money**—During the last two years Congress appropriated nearly $108 billion in new obligational authority for defense—$48.2 billion for 1951 and $59.4 billion for fiscal year 1952. "Of this amount," Lovett said, "$70 billion had been obligated by Dec. 31, 1951 and the remaining balance of $38 billion, representing current operating expenses and funds for aircraft, ships, and other major items, will be obligated by the end of the fiscal year in June, 1952."

About 50% of the current budget of $59.4 billion is to be used for major procurement and production, 20% for operation and maintenance of installations and equipment, 17% for military personnel costs, 7% for construction and the remaining 6% for miscellaneous military activities.

The problems of building an adequate defense have been considerable, Lovett said. "A shortage of machine tools and difficulties in the production of certain types of aircraft and tanks caused some delays during the past year."

▶**Raw Materials Critical**—"The scarcity of certain basic raw materials is likely to be a very critical factor in months ahead," he said, "and to meet such problems, techniques for the analysis of requirements and the schedules of procurement have already been greatly improved over what they were a year ago."

The Air Force during the six-month period covered by Lovett in his report has been struggling to spread itself across three primary areas of activity: 1. Korea; 2. In continuing the buildup toward 80 combat wings, plus 15 supporting groups; 3. Deployment of USAF air strength into strategic areas in accordance with national commitments.

In a memorandum to the Defense Secretary for inclusion in the report Air Force Secretary Finletter warned Lovett that "the increasing drain upon our resources in consequence of the Korean operation has affected (Air Force) capacity to fulfill our plans and schedules in the other two primary areas of activity."

Hot-Rod Jets

- **A design engineer looks into aviation's future.**
- **And he sees jet-powered executive transports.**

Just around the corner for the fast-travelling U. S. business executive is a speedy jet-powered executive plane.

Tomorrow he will be able to hot-rod around the country at 400 mph. in a pressurized jet executive plane, R. M. Harman, Beech Aircraft's chief design engineer, is forecasting.

But first a few things have to be taken care of—such as jet fuel consumption and the cost of pressurization system. There is nothing available in pressurized equipment for small planes now that doesn't cost more than the initial cost of the airplane itself, Harman says.

▶**Cost $85,000**—The Beech engineer made his qualified prediction in a recent paper before the Washington Section of the Institute of the Aeronautical Sciences.

Running down the various design problems of a proposed four-place executive air runabout, powered by two 850-lb.-thrust jet engines with a 400 mph. top speed and 500 mi. range, he estimates that such a plane would cost about $85,000 today in quantities that could probably be sold. But further advances in jet power plants will make them competitive with piston engines in the executive aircraft field in a few years' he predicted.

Need for twin-engine executive planes capable of competing with today's airliners in speed and operating conditions will bring about development of faster executive planes with such niceties as thermal deicing and pressurized cabins.

▶**First Step to Jets**—Harman thinks that a plane with such characteristics as Beech's new T-36 will likely be an intermediate step between the jets and today's bi-motored executive aircraft. Among the executive planes of today in this category are included the twin Beech Model 18, the Twin Bonanza, the Aero Commander, and executive versions of military and transport planes, such as Douglas DC-3s, Lockheed Lodestars, B-25s, B-23s, B-26s and B-17s.

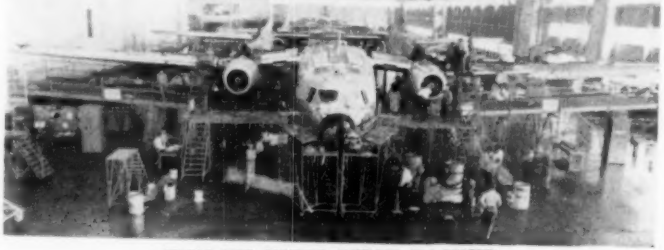
The new Beech airplane, which has not yet flown, offers interesting future possibilities for civil executive travel whenever the present USAF requirements for it as a navigation trainer and personnel transport are satisfied, he said.

Model 46, as Beech calls the plane, is powered with two Pratt & Whitney R-2800 engines, similar to the powerplants of the Convair Liner and the Martin 4-0-4. Harman says it will have a cruising speed equal to or slightly above that of airliners which are now in service.

Some other refinements which he cites for the Model 46 are: single engine performance well above 13,000 ft.; ability to take off from average runways; range with standard tanks of over 1,500 mi. and pressurization for comfortable operations up to 30,000 ft. The Model 46 accommodates ten comfortably in the passenger cabin, or more in higher-density arrangement.

Subsidy Separation

House Interstate and Foreign Commerce Committee will open hearings in "near future" on Senate-passed legislation for separation of subsidy from mail pay.



WILLOW RUN'S FIRST PACKET

Kaiser-Frazer Corp. has proudly rolled the first C-119 out of the giant Willow Run plant and announced that the plane would go into flight test immediately. It is the first ship to be produced at Willow Run since World War II, when Ford was putting B-24s together at the rate of one an hour. The C-119s, coming off a line paralleling the assembly line which is producing 1952 Kaiser-Frazer car models, are being phased out for the production of C-123 assault transports. Edgar Kaiser, president of K-F and Chase Aircraft, expects that the first C-123 will be completed early next fall.

ATA Pushes Study Of Airborne Radar

The first joint airline action toward possible fleet-wide use of airborne radar to warn of extreme turbulence and terrain obstacles has been launched by the Air Transport Assn., an American Airlines official has told AVIATION WEEK.

ATA, according to M. G. Beard, chief engineer for AA, has notified radar manufacturers of current airline interest in such a device and is setting up a joint airline/radar industry meeting to discuss what may become a multi-million dollar program.

Meanwhile, ATA is drawing up specifications covering radar operating characteristics desired by interested airlines.

▶**Warning & Picture**—By warning the pilot of severe turbulence and showing him smooth paths through storms, American can economically justify the use of radar, Beard feels. The device will also warn of terrain obstacles and show the pilot what path he must fly to avoid them. Eventually radar may be used for en route navigation and perhaps instrument approaches, but not to displace existing primary radio aids.

Beard calls radar a must on jet transports where turbulence increases proportionately to the higher speeds. For reasons of fuel economy, Beard said, jet transports cannot afford to fly around possible turbulent areas or fly through at reduced speeds.

American Airlines was ready to buy radar for its fleet in 1947-48, but for financial reasons shelved these plans which had advanced to the specifications stage for an improved version of General Electric's wartime APS-10 radar.

Airline flight tests of prototype radars to prove their reliability must precede any fleet-wide installations, Beard said.

Secret Weapon

(*McGraw-Hill World News*)

Rio de Janeiro—Add to the list of anti-aircraft weapons the rawhide lariat of southern Brazil. Production costs are small and it does the trick.

A gaucho herdsman in Brazil's southernmost state of Rio Grande do Sul has given a successful demonstration. Annoyed by a low-stunting two-place trainer from a nearby aero club, he tossed his loop at the aircraft as it dived on him. The rawhide cord snagged the propeller which in a few seconds tore off, forcing the plane to a dead stick landing in a nearby pasture. No one was hurt.

Fare Fight

- **Trunks ask higher rate to insure fair return.**
- **But CAB says return is pretty fair now.**

Despite the Civil Aeronautics Board's recent re-statement of a policy to reduce air fares, every major domestic airline has made an official or unofficial proposal to raise passenger fares effective next month. But CAB's Rates division opposes any general raise at this time.

And observers expect the Board itself to ignore the plea for higher rates until the airlines can justify the raise. American Airlines last week had not come up with the justification requested of it by the Board. The Board has until Apr. 15 to suspend or okay the first of the new fares.

▶**The New Method**—Rather than the traditional request to raise fares on a milcage basis, most of the airlines this time, led by American, have come up with a new formula. It has variations:

- **$1 more per ticket** and elimination of roundtrip discount. This is the proposal of American (except on its $99 transcontinental coach), Capital, Continental, Northwest, TWA (except for transcon coach and intra-state California fares), United (with same exceptions as TWA), Delta, Eastern, National (except for coach), Western.
- **Elimination of roundtrip discount** plus selective fare increases. This is advocated by Pioneer.

Two other carriers, Braniff and Mid-Continent, favor a general fare raise and elimination of family fare and other special discounts. However, they would retain the roundtrip discount and oppose the across-the-board $1 increase.

Chicago & Southern and Northeast reportedly were preparing to follow the lead of American, but withdrew.

Colonial is asking selective fare increases.

▶**CAB Position**—The price-setters on the CAB staff are against granting any such general fare raise. And a member of the five-man Board itself says he believes the Board will back up its staff for the present. This means that unless American can change the minds of the Board majority, the airline fare raises filed to become effective next month will be suspended.

When it suspends a fare filed by an airline, the Board orders an investigation and hearing. That's the outlook for next month—the start of a full-scale investigation into whether fares should go up.

Meanwhile, here's some of the evidence cited by the CAB staff opposing a rate raise next month. Despite airline cries of rising costs, they've shown no proof yet that profit margins are below a "fair return"—generally considered as 7 to 10% on investment.

▶**Big Enough Cushion**—In fact, Board compilations of the airlines' reported earnings show net operating income of $108,196,000 for the 16 trunk lines before taxes in the 12 months ended last Nov. 30. That's a pre-tax return on investment of near 30%, the Board estimates. Assuming taxes cut that more than half, the return last year still exceeds 10%. That's a big enough cushion to take the lines through any temporary adversity this year, some Board officials say.

And although airline labor costs have increased recently, the CAB officials cite recent declines in materials costs as a partial offset, and an indication that costs may not be going up steadily for the rest of this year. Wholesale prices were two points lower this January than a year ago, CAB points out.

The CAB attitude is to wait and see if the airlines can prove that costs are going to force earnings under a fair return. The Board considers rate-making power as a substitute for the free-market competition that sets commodity prices. Until the need for a general price rise is proven, the Board will not be anxious to raise fares, a Board official says.

What may come out of the anticipated CAB investigation this spring is a selective raise on short-haul transport. That is a change that American Airlines has advocated for some time. Unit costs are higher on short hauls than long hauls. The one-dollar raise on all tickets is one way to do it. But observers don't expect the Board to grant even that without some months of investigation.

UAC Reports

Sales of $417,211,980 for the year ending Dec. 31, 1951 yielded net income of $14,266,867 after taxes totaling $17,960,738, United Aircraft Corp. reported last week. For the preceding year, sales were $269,255,588, taxes $15,269,924, and net income $13,204,128. The federal government took in taxes a greater portion of United's increased sales than the company did in profits.

The report states that renegotiation of 1948 and 1949 sales has been concluded with the determination that no refunds are payable by the company. Renegotiation proceedings on 1950 and 1951 sales have not yet begun but UAC does not believe any refunds will be necessary for those years either.

Backlog during 1951 rose from $715 million to $1.3 billion. Employment increased from 28,894 to 43,347, of whom 8,405 are women.

Curtiss-Wright Faces a Busy Year

Company appears ready to open large-scale production attack on $1,025-million backlog of orders.

By William Kroger

More evidence that the aircraft industry has nearly completed its get-ready stage and is entering a period of large production is furnished by the annual report of Curtiss-Wright Corp.

Shipments of C-W's engine division in January of this year were running 90% ahead of the same month a year ago; for the entire company, shipments were 75% ahead of the 1951 period.

To attain that point, C-W, as did the other large companies, went through a year of tremendous investments in new facilities, increased sales, mounting inventories and backlogs, and greater taxes that cut net income below that of 1950.

During 1951, C-W added slightly more than $19 million worth of brick-and-mortar to its establishments—900,000 sq. ft. to its jet engine plants at Wood-Ridge, Caldwell and Garfield, N. J.; 200,000 sq. ft. for a new electronics plant at Carlstadt, N. J.; 250,000 sq. ft. for its metal processing division at Buffalo, N. Y.

C-W revenue for the year ending Dec. 31, 1951, was $177,457,021, and income before taxes $14,958,216. For the preceding year, revenue was $136,608,602 and income before taxes was $13,628,564. But taxes in 1950 were $6,350,000, against $8,050,000 in 1951, pulling net income for 1951 down to $6,908,216 compared to $7,278,564 in 1950.

The company's backlog rose steadily throughout the year and was still rising at the end of the reporting period. C-W entered 1951 with firm backlog of $300,400,000. At the end of the year it stood at $533,200,000 and by the end of February this year was $682,400,000. Including letters of intent, C-W's current unfilled orders total $1,025,000,000.

Working up to a major assault on that backlog, C-W during the year piled up inventories in excess of $98 million (compared with $29,610,842 in 1950), partially offset by payments by the government of over $48 million.

Highlights of C-W activity:

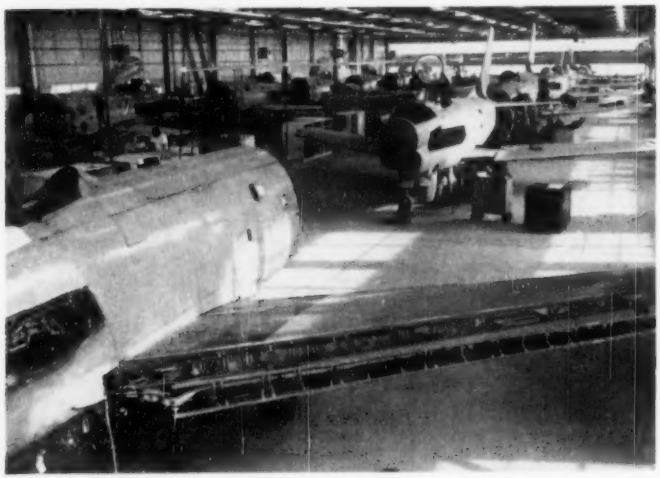
• **Steel center section** for jet engines, produced by the metals processing division, is claimed to be the first of its kind, costs about $1,000 vs. $4,700 for a similar aluminum section. Steel section weighs no more but increases performance.

• **Turbo-Compound** engine completed 150-hr. type test at 3,500 hp.

• **Extruded propeller blades** are in the pre-production stage. Extrusions will be made on a 12,000-ton press to be installed by the Air Force at the metals processing plant in Buffalo.

• **First Turboelectric propeller** for Douglas C-124B turboprop transport was tested and delivered.

• **First J65 jet engine** was produced and put on test.



SABRES GET ALL-WEATHER EQUIPMENT

Typifying the production complexity of modern jet fighters, this view taken inside North American's new preflight hangars at Los Angeles International Airport shows a batch of F-86D all-weather fighters partly disassembled for installation and checking of their complex radar gear and other related equipment. After equipment is installed, planes are flight tested prior to delivery to USAF. Plane in foreground has leading edge detached for access to wing plumbing. The two 100x200-ft. hangars have overhanging roofs to permit work outside even during bad weather.

NYA Wins

- **Board upholds award of helicopter certificate.**
- **Now N. Y. Airways can start—when it gets craft.**

New York Airways seems to have won the final round in its long certification fight with Metropolitan Air Commuting. Within a year it hopes to bring scheduled helicopter service to the nation's biggest metropolitan community.

Now NYA is ready to start setting up an airline from scratch—hiring personnel, renting space, and—most difficult of all—obtaining helicopters.

Army, Navy and Marines say they can't get enough copters now or for some time to come. Copter production schedules are sewed up tight for a year in advance.

▶ **Support in Sight**—But New York Airways counts on some military support and greater backing from manufacturers for the contention that small scheduled civil copter operations give the military invaluable operating, maintenance and economic data—worth many copters in the long push. NYA therefore hopes to get a small-scale operation going in New York this year.

And the Air Coordinating Committee, consisting of military as well as civil agency representatives, has stated that expansion of scheduled civil copters will contribute to national defense.

The first year of copter operation, NYA will give only mail and cargo service to the metropolitan area, but may shuttle passengers over the inter-airport triangle of LaGuardia-Idlewild-Newark. After the first year of scheduled service, NYA can introduce passenger service among the suburbs and to downtown Manhattan. Inauguration of each route service is subject to CAA safety certification.

▶ **Teeter-Totter Background**—Throughout most of last year the Civil Aeronautics Board majority vacillated, giving the decision first to NYA, then

to MAC, and back again. On Dec. 3 the Board gave the New York franchise to New York Airways. But the certificate was contingent on the company's raising the last $200,000 to bring its common stock capitalization to $1,100,000.

Metropolitan first filed a routine petition for reconsideration; then it came up with a completely new proposal: Robinson Airlines, local service line in New York and New Jersey, would buy out MAC if the Board would then grant the New York franchise to that combination instead of NYA. Robinson and MAC cited the fact that as metropolitan copter service grows it will conflict with the local-regional lines. So why not grant the Metropolitan franchise to a local service line and avoid inevitable conflict?

Although this was a somewhat new approach to the situation, the Board apparently rejected this last effort to reverse the tide running in favor of NYA.

On Jan. 3 New York Airways handed the Board affidavits showing it had the required $1.1-million equity on hand and was ready for business. It took CAB until mid-March to come out with the final okay for New York Airways.

President of the company is John L. Senior, Jr.; company address is 331 Madison Ave., New York 17, N. Y.

New Indictments in AF Irregularities

Dayton—Two men named in indictments charging bribery and conspiracy in connection with Air Force procurements will be arraigned in the U. S. district court here Mar. 28. Defendants are:

- **Robert G. Hollifield, Sr.**, former unit chief in the Aero Medical Laboratory of the Wright Air Development Center, Wright-Patterson AFB.
- **William J. Opper**, Chicago jobber.

The indictments include four counts of bribery and one of conspiracy for each of the two. They are free on bond, $1,000 for Hollifield and $2,000 for Opper.

Overt acts charged in the indictment include acceptance of $1,600 in cash by Hollifield during the interval from Mar. 1, 1950, until Aug. 5, 1951, during which time Opper received six contracts for sun glasses and ski goggles. The indictment charged that payments were made both in Dayton and Chicago.

Another of the overt acts listed in the indictment alleges that Hollifield recommended purchase of Opper's stock despite protests of another laboratory unit that the glasses and goggles did not fill Air Force requirements.

Hollifield previously had been linked to another procurement irregularity case, evidence of which is in the hands of the Department of Justice.

This is the second court action involving an Air Force employe and a contractor. Judge Robert R. Nevin recently sentenced an Air Force buyer to 18 months and a contractor to three years in a federal penitentiary following their conviction on a gratuities charge.

New Intercept

- **NAA building system for own USAF, Navy planes.**
- **First time one company does whole job.**

A new automatic avionics intercept system developed by North American Aviation and comparable to the Hughes Aircraft 1954 intercept system has been ordered by both the Navy and the USAF.

This makes NAA a major contender in the fast-growing interceptor avionics field. It is believed that both Navy and AF equipment will be installed in NAA-built aircraft for evaluation tests. (NAA is currently tooling up for production of the Navy FJ-2, a carrier version of the F-86 Sabre.)

▶ **Significance**—Disclosure of North American's entry in this new field is noteworthy for many reasons:

- **It is the first time** that an airframe and its avionics system have been engineered "under one roof." The success of this approach to solving airframe/avionics integration problems will be closely watched by the industry.
- **It is the first complete** interceptor system contract which BuAer has let. Previously BuAer purchased intercept radars, computers, and autopilots separately. Old-line Navy radar, computer, and autopilot manufacturers therefore have a big stake in the success or failure of this new system's approach.
- **It is USAF's first attempt** to place some of its interceptor avionics system eggs in another basket. Hughes Aircraft has been USAF's sole supplier.
- **It is evidence** of growing inter-service cooperation in procuring avionics equipment. The Navy uses AF-developed communications and navigation radio equipment. The Air Force is currently using a Navy-developed interceptor range-type radar with great success in Korea.

▶ **Eliminating Tubes**—Little is known about North American's intercept system, although it is said to make wide use of magnetic amplifiers in place of vacuum tubes. This feature would make it extremely attractive to both services because of reliability problems with vacuum tubes.

North American reportedly carried out the initial system study and development with its own funds until the equipment was sufficiently advanced to demonstrate advantages which attracted military support for the program.

NOW YOU SEE IT—NOW YOU DON'T

Interesting set of flight photos above shows Ted Nelson's graceful Hummingbird sailplane with its 40-hp. H-59 auxiliary engine extended and running (top), then with engine retracted and completely faired over (bottom). Powerplant eliminates need for tow takeoff and fuel capacity permits climb to about 12,000 ft. Top speed with power is 80 mph. at 3,000 ft. Best low sinking speed is 3.25 fps. at 45 mph. Span is 54 ft.

FINANCIAL

Martin Illustrates Aviation Risks

With a backlog of over $400 million—$350 million of it military—company is still not assured of profits.

Large backlogs, encouraging as they may be, are in themselves no guarantee of profitable operations for aircraft companies. This is amply demonstrated by the experience of the Glenn L. Martin Co., whose annual report has just been released.

For the year ended Dec. 31, 1951, a net loss of $22,178,434 was reported—the largest in the company's history, exceeding the previous peak loss of $19.2 million, which was established in 1947.

▶ **Commercial Loss**—The chief cause of the large deficit was commercial production—some $22 million was lost last year from this source, represented by the 4-0-4 contracts. Another $2 million was lost in 1951 on military aircraft subcontracts. This latter development should dispel any fallacy that government military contracts carry with them a definite profit assurance. A real risk is always present and the Martin case demonstrates that substantial losses from this activity can happen.

The Martin annual report is statesmanlike in its approach in detailing the events of last year and revealing its current position. Signed by the company's new president, who assumed office only a few days earlier, the report outlines background developments responsible for the Martin losses and the hopes entertained to resolve the present dilemma.

Reference is made to the 1950 annual report which asserted, "The amounts of the subcontracting, commercial aircraft and miscellaneous military orders obtained during the first six months did not promise impressive immediate profits within themselves."

> **It is clear that much of this work was assumed to provide continuing employment and to maintain an adequate minimum skilled working force so as to assure a manufacturing facility in being.**

However, events largely beyond the control of the company took hold and resulted in sharply increased costs which "differed with increasing severity from those which had been projected." The factors cited included rising material costs and wage rates.

The net losses of more than $22 million for 1951 are estimated to cover the deficiencies between selling price and cost of production on the commercial orders and military subcontracts which are scheduled for completion before the end of 1952.

A footnote added to the balance sheet calls attention to the fact that about $3 million in general and administrative expenses are included in the inventory account at Dec. 31, 1951. While this is a common practice among many aircraft companies, it is not the most conservative accounting treatment. Until deliveries of all contracts on work covering such inventories is completed, there is no certainty that further write-downs may not be necessary.

▶ **Book Equity Low**—An interesting commentary in the Martin picture is revealed by the almost complete disappearance of the company's book equity position. At the end of 1946, Martin showed a net capital equity of more than $53.5 million or better than $46.50 per share. The series of deficits in 1947 and 1948 totaling more than $36 million and resulting primarily from the costly 2-0-2 venture together with the 1951 deficit have combined to form an entirely different equity position.

> **At Dec. 31, 1951, net worth was reduced to $564,132 or less than 50 cents a share. This is the lowest for the company in more than twenty years. Even at the 1935 year-end, net worth at $830,000 was larger than the present position.**

This almost complete evaporation of the company's net worth position is significant from a number of aspects. It demonstrates that in the absence of sustained profitable operations it does not take much of a reversal to wipe out years of accumulated effort in building up an equity. Moreover, a serious question is also raised as to using net worth in measuring profitability in the aircraft industry.

The company calls attention to a tax credit of not less than $40 million which it may apply against book income for tax purposes in the four years, 1952 through 1955, and possibly thereafter. However, there is no assurance that profitable operations will ensue to fully offset this tax credit.

The Martin backlog now totals over $400 million, of which $350 million is military business. The management expects the receipt of additional defense contracts. Profit margins on government contracts are patently low. It then becomes a question of how much volume the company can produce in the years to come.

Management is hopeful that with its backlog and tax credit, considerable improvement will ensue in its financial condition.

▶ **Refinancing Plan**—A major refinancing is now in store for the Martin company. The chief elements include the following:

- Additional V-loans from $10 million to $27.5 million and extension of the maturities from July 1, 1952 to July 1, 1953. (Notes payable amounted to $20,972,425 at Dec. 31, 1951.)
- Authorization of new loans from the Reconstruction Finance Corp. under the Defense Production Act of 1950 in the aggregate amount of $12 million and extension of respective maturities of existing RFC commercial loans from July 1, 1953 to July 1, 1954. (Notes payable to the RFC amounted to $14,582,590 at the 1951 year-end.)
- Eastern Air Lines and TWA have also agreed to modify their purchase contracts on the 4-0-4 by granting a price increase of $25,000 per plane. (This would result in an additional $2,125,000 for the 101 planes already ordered.)
- Additional capital will be provided through a proposed underwriting of $6 million in convertible subordinated notes and related stock purchase warrants for 100,000 shares of stock. The notes would be convertible at $6 per share. The complete conversion would double the existing common stock issue outstanding.
- As an offset to the debenture issue, stockholders will be offered rights to subscribe to an equal number of shares now held at the rate of $6 per share. The notes will be redeemed without premium for the first seven months to the extent of funds provided through the stock subscription route. (Glenn L. Martin, chairman, who owns 293,700 shares or approximately 25% of the total outstanding, has agreed to waive his subscription rights.)
- An additional 200,000 shares of common stock will be reserved for the granting of options to key officials.

It is obvious that the existing common shareholders will suffer tremendous dilution of their equity. Moreover, a material debt reduction program will have to be completed before any return on the capital may be realized in the form of cash disbursements to the stockholders.

The financial case history of the Glenn L. Martin Co. clearly demonstrates that the aircraft industry, despite substantial government contracts, is by no means a risk-free enterprise.

—Selig Altschul

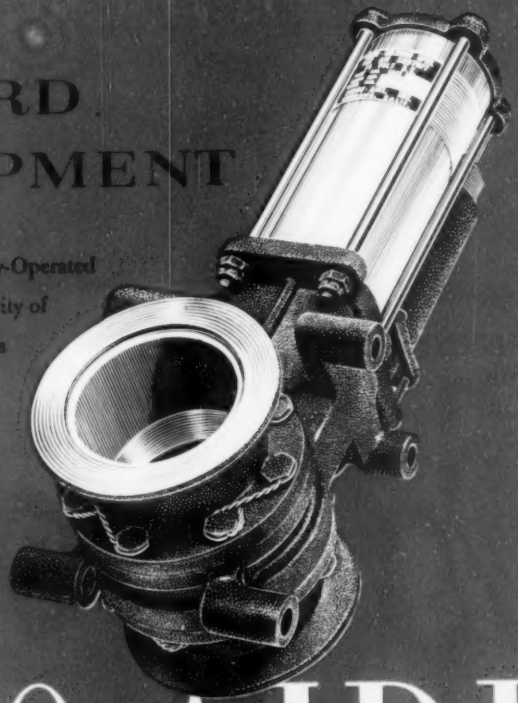
Wherever Man Flies

Hamilton Standard's long experience as the leader in propeller design and production is also devoted to supplying other equipment for such outstanding airplanes as the Chance Vought F7U-3 "Cutlass", jet fighter for the Navy.

HAMILTON STANDARD

PROPELLERS ★ STARTERS ★ AIR-CONDITIONERS ★ FUEL CONTROLS ★ AUXILIARY DRIVES ★ HYDRAULIC PUMPS

STANDARD EQUIPMENT



This Hydro-Aire Pneumatically-Operated Hot Air Shut-Off Valve is used by a majority of America's jet engine manufacturers. This and various adaptions are also employed as shut-offs for turbine-driven accessories, anti-icing units and heating systems. It is another example of Hydro-Aire Engineered Products which are Standard Equipment on America's leading airplanes.

HYDRO-AIRE

HYDRO-AIRE *Inc.*

Subsidiary of Crane Co.

EVERY FIGHTER, EVERY BOMBER, EVERY TRANSPORT IS HYDRO-AIRE EQUIPPED

BRISTOL BRITANNIA, shown here in artist's conception with BOAC markings, is scheduled for long-range routes by 1954.

Bristol Britannia Nears Final Assembly

- **Huge transport slated to fly this summer.**
- **Full-scale mockup speeds engineering tests.**

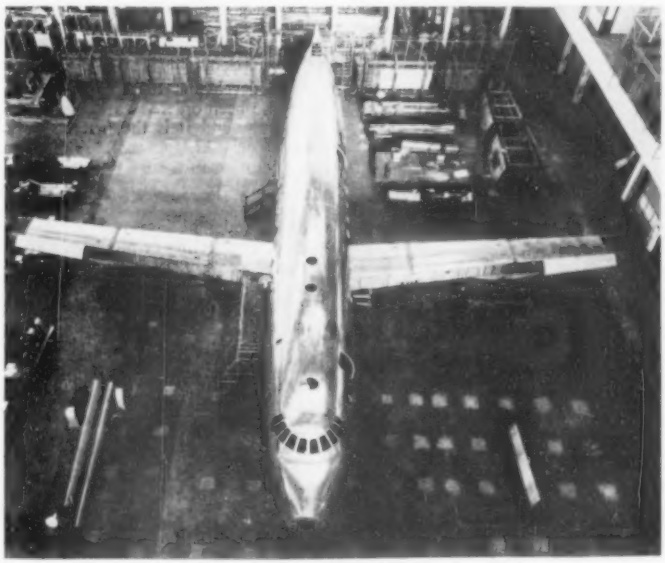
By David A. Anderton

The Bristol Britannia, long-range turboprop transport now in production for British Overseas Airways Corp., has reached the stage of prototype final assembly.

New pictures of the craft in the gigantic assembly hall at Bristol's Filton plant show the main wing structure attached to the fuselage. Although this is only the first step in the long assembly process, it immediately sets the airplane up for fitting all the other components. From here on in, assembly should be fairly rapid.

And it's going to have to be rapid to meet the scheduled first flight date of summer, 1952.

▶**On Order**—BOAC has ordered 25 Britannias, to be powered with Bristol's Proteus turboprop engine. The planes are scheduled to serve trunk routes to



EARLY STAGE of final assembly shows the first prototype Britannia with wings attached and fuselage skinning completed. Next stage adds engine nacelles.

Clearly the Best way to clean a windshield...

WHIZ "C" WINDSHIELD CLEANER

Here's Why "C" is BEST

1 NON-CRAZING—Can be used on glass or any plastic—contains no harmful solvents. Will not craze or cloud.

2 WORKS FAST—Quickly removes oil spatter, grime and bug juice.

3 EASY TO APPLY AND REMOVE—Leaves surface clear—free of dust or film.

4 NOT ABRASIVE—Cannot scratch or dull window surfaces.

5 NON-INFLAMMABLE, NON-TOXIC—"C" is safe to use—safe to store!

"C" is a quality WHIZ product—made by the world's largest manufacturer of quality maintenance products.

Ask your supplier for

WHIZ "C" WINDSHIELD CLEANER

CLEARLY THE BEST

Whiz

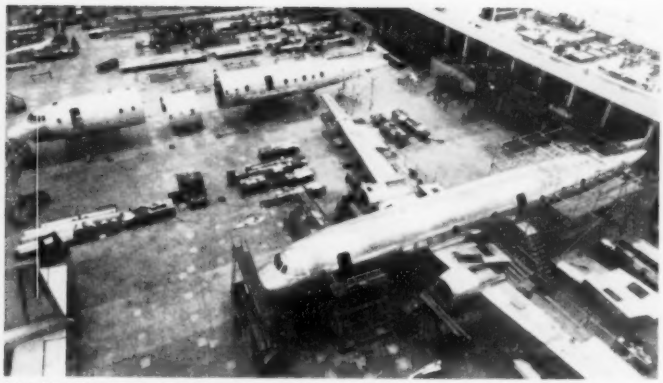
Available in pints and gallons

Industrial-Aviation Division

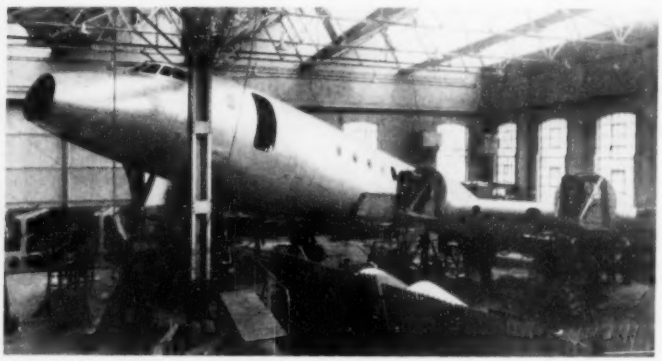
R. M. HOLLINGSHEAD CORP.

Leader in Maintenance Chemicals

Camden 2, N. J. Canadian Offices: Toronto



PROTOTYPE BRITANNIAS No. 1 and 2 share the giant assembly hall at Filton. First prototype, in foreground is scheduled to fly in summer, 1952.



CLIMBING MOCKUP, tilted upward to simulate sustained climbing flight, is being used in one phase of complicated tests of Britannia fuel system.

Australia and South Africa, starting in 1954 or 1955.

Two development prototype aircraft have also been ordered for the Ministry of Supply, and it is the first of these that is due to fly this year.

In addition to these 27 complete airframes and spares, the Bristol organization is building:

- **A full-scale mock-up**, for functional tests of engineering or production principles.
- **A full-scale wing**, complete with nacelles and partial fuselage, for structural tests.
- **A half-scale fuselage**, also slated for structural tests.
- **A forward fuselage** 30 ft. long, for pressurization tests.
- **Scaled-down control surfaces** fitted to a Bristol Freighter for flight tests for comparison with results of windtunnel tests.

▶ **Comparison**—Nearest American geometric counterpart of the Britannia would be the Boeing Stratocruiser. Britannia has a 140-ft. wingspan and currently grosses 140,000 lb. (Available data and a first-hand report on the plane were given in AVIATION WEEK Nov. 5, 1951, p. 24ff.)

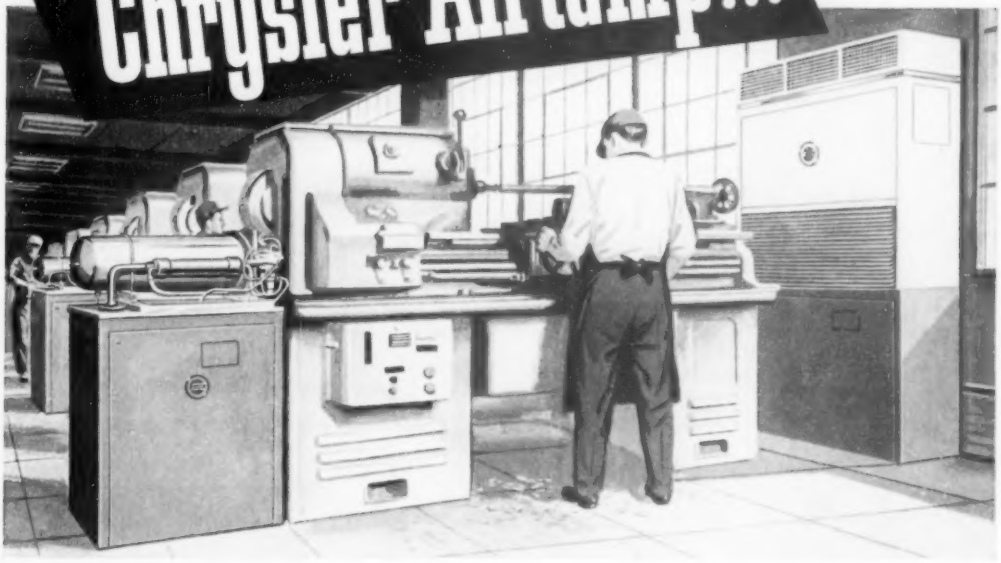
Engines are four Proteus 2 turboprops, but English sources have already hinted that the Britannia will be underpowered with these engines, and that the Proteus 3 will be the production powerplant. Current power output for the Proteus 2 is 3,200 bhp. from each engine.

Total fuel capacity is given as 8,750 U. S. gal. It is loaded in 14 bag cells, seven in each panel.

Seating capacity varies from 50 to 100, depending on the customer's wishes. One particular arrangement could carry 50 passengers and luggage nonstop between London and New York during 80% of the existing weather conditions. It could always make the New York-London haul.

▶ **Functional Mockup**—Bristol's full-scale mockup is the logical extrapolation of standard practice in the aircraft industry. All manufacturers make mockups of all or part of their aircraft. Some of these are quite simple, and use wood or cardboard; others are quite complex and use metal. But it's the general be-

Chrysler Airtemp...



LIQUID COOLANT COOLERS AND PACKAGED AIR CONDITIONERS*

TAKE THE HEAT OFF HIGH SPEED PRODUCTION

Uncontrolled temperatures play havoc with high speed production schedules. Workers and machines are less efficient, both fail to give peak performance unless temperature levels are kept at a constant degree. Here's where Chrysler Airtemp can help. When you install Chrysler Airtemp temperature-control equipment in your plant, production will increase. Costly breakdowns and failures—of men and machines—will be averted. Chrysler Airtemp products are factory engineered and warranted to give effective temperature-control. Mail coupon today for full details on how Chrysler Airtemp can bring you the benefits of proper temperatures in your operations.

LIQUID COOLANT COOLER*

Handles all types of coolants from aqua solvents to heavy tapping and hydraulic oils. Installation permits one cooler to service one or several machines.

PACKAGED AIR CONDITIONERS*

Compact, easily installed. Six available sizes of 2, 3, 5, 11 and 15 ton. Units are factory-assembled and tested.

***COMPLETE FIVE-YEAR WARRANTY**

Compressor units in all "Packaged" Air Conditioners and Liquid Coolant Coolers carry an optional five-year warranty, through dealers. This warranty covers compressor replacement, freight to and from the factory, plus a labor allowance for removing and installing compressor assemblies.

Chrysler Airtemp

AIR CONDITIONING • HEATING • COMMERCIAL REFRIGERATION

Airtemp Division of Chrysler Corporation, Dayton 1, Ohio

CHRYSLER AIRTEMP

A VITAL FORCE IN NATIONAL DEFENSE

Airtemp Division, Chrysler Corporation
Dayton 1, Ohio

Please send me information showing how Chrysler Airtemp can help me boost production with "packaged" Air Conditioners and Liquid Coolant Coolers.

Name _____

Firm _____

Title _____ Phone _____

Address _____ Zone _____ State _____

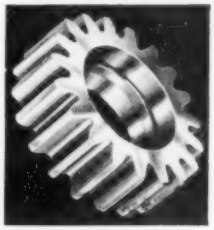
City _____

Ever see a helicopter grit its teeth?

To temper a steel gear to almost incredible hardness . . . to machine it to tolerances of 1/10,000 of an inch . . . Bell Aircraft Corporation called on Lycoming's skill, experience and extensive facilities.

Such super-precision work typifies simply *one* of Lycoming's services to America's leading industries and to its military forces. Long famous for aircraft engines, Lycoming also meets the most exacting and diverse requirements for packaged power, for product development, for high-volume production.

Whatever your problem—however complex your specifications—look to Lycoming!



When a helicopter's giant blade spins, tiny two-inch gears must carry the load. For teeth with a perfect bite, **Bell Aircraft chose Lycoming's precision production.**

AIR-COOLED ENGINES FOR AIRCRAFT AND INDUSTRIAL USES. PRECISION-AND-VOLUME MACHINE PARTS. STEEL-PLATE FABRICATION. GRAY-IRON CASTINGS

LOOK TO LYCOMING FOR RESEARCH FOR PRECISION PRODUCTION

LYCOMING-SPENCER DIVISION, WILLIAMSPORT, PA.
BRIDGEPORT-LYCOMING DIVISION, STRATFORD, CONN.

AVCO MANUFACTURING CORPORATION

lief that Bristol has built the first functional mockup for a civil aircraft.

In developing the mockup, Bristol used parts which were the first run from production tooling; such parts are usually scrapped. In general, prototype metal thicknesses have been maintained, although sub-standard materials were used.

For simplification—and because a certain degree of looseness would be permitted in a non-flying airplane—Bristol relaxed a bit on the details. Inspection of parts was not so rigid, and such niceties as flush rivets were eliminated by ordinary rivets.

The mockup includes the fuselage, back aft to the wing trailing edge. The left wing is complete with nacelles, and extends to the left aileron. The right wing includes only the inboard nacelle. Complete landing gear—mainwheel and nosewheel—is installed, and so are the right wing flaps. The cockpit has flight controls in place; from them, the control systems run as far as permitted by the completeness of the mockup. At their ends, these systems can be connected to devices for simulating control surface loads.

▶ **What Good?**—This non-flying aircraft serves as an accurate three-dimensional check of installation layouts. Bristol says that the accuracy of checking is much greater with a metal mockup than with the standard wooden one. (Incidentally, Bristol also built a wooden mockup for more conventional and approximate procedures.)

It is also possible to check complete systems on this mockup, a scheme not generally done with wooden models.

Servicing and maintenance procedures can be determined and checked and corrected here before the craft gets out into service. The saving here is obvious.

And in addition, Bristol says that the mockup will eventually be convertible into a realistic crew trainer.

It would also seem that such an accurate mockup would serve as the first proving ground for changes and modifications for later models of the Britannia. If, for example, the Bristol people were to follow American practice on their pretty plane by slicing it and inserting a chunk of fuselage, the mockup would be the logical place to start developing such a change.

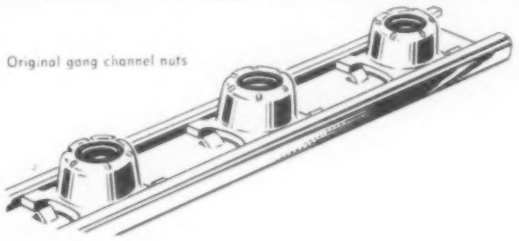
Bristol lists these systems which can be tested on the functional mockup: engine and flight controls; fuel, hydraulic and electrical systems; air conditioning, fire precaution, emergency and radio equipment.

▶ **Fuel System Tests**—First tests made with the aircraft systems on the mockup were complete checkouts of the fuel system. Exactor rigs, normally used for testing the fuel system between tanks

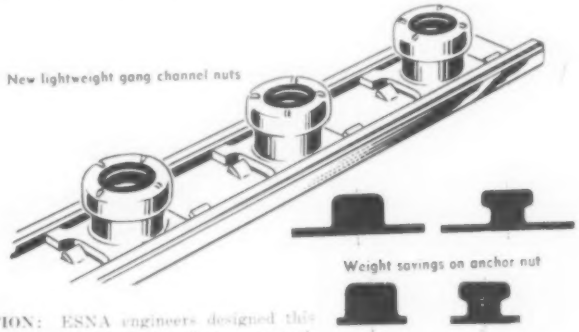
Advertisement

Fastener Problem of the Month

Modern Demands for Weight Saving — **March, 1952**



PROBLEM: In every phase in the construction of today's high speed aircraft, designers are looking for weight-savings. So, here at ESNA, it was felt that nuts which saved weight without sacrificing strength would be an important contribution—adding a further advantage to the assembly-time savings offered to the aircraft industry by the original vibration-proof gang channel nut strip design.



SOLUTION: ESNA engineers designed this new gang-channel assembly, offering strength equal to the previous design, while reducing weight by 30%. The new nut is supplied assembled in a 21S-T4 high strength aluminum-alloy channel, blue anodized for ready identification. And like all Elastic Stop Nuts, the integral red locking collar assures a vibration-proof grip on the bolt threads, protection against corrosion, a constant self-locking torque that makes uniform bolt loading easy . . . and re-useability. A weight-saving of 25% was accomplished in a similarly redesigned anchor nut. Both new nuts conform to all requirements of AN366.

YOUR FASTENING PROBLEM probably has a standard ESNA solution. If not, ESNA engineers may suggest special fasteners.

Dept. N11-325, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, N. J.

Please send me the following information on ESNA self-locking fasteners:

☐ Elastic Stop Nut Bulletin

☐ AN-ESNA Conversion Chart

☐ Here is a drawing of our product. What self-locking fastener do you recommend?

Name ..... Title .....

Firm .....

Street .....

City ..... Zone ..... State .....

LEWIS

Standard Temperature Indicators for Aircraft

USED BY LEADING AIR LINES, THESE INDICATORS HAVE PROVEN THEIR RELIABILITY BY YEARS OF SATISFACTORY SERVICE.

THERMOCOUPLE TYPE

All LEWIS thermocouple indicators are fully cold-end compensated, magnetically shielded and are available for use with iron-constantan, copper-constantan or chromel-alumel thermocouples in all standard ranges for the thermocouple material used. A few typical ranges are listed below.

MODEL 17B

MODEL 17B, 2¾" case to AND 10401
—50 to +300°C Cylinder Temp.
(AN 5536-1A or T1A)
—50 to +300°C Bearing Temp. . . .
0 to +1000°C Exhaust Temp.

MODEL 49B

MODEL 49B, 1⅞" case to AND 10403
—50 to +300°C Cylinder Temp. . . .
0 to +1000°C Exhaust Temp.

MODEL 76B

MODEL 76B dual, 2¾" case to AND 10401
—50 to +300°C Cylinder Temp.
(AN 5536-2A or T2A)
—50 to 300°C Bearing Temp. . . .
0 to +1000°C Exhaust Temp.

RESISTANCE TYPE

Accurate ratiometers, these LEWIS indicators are remarkably free of voltage error, have nearly linear scales (not crowded at the ends) and are magnetically shielded. A few typical ranges are given below. Not shown is Model 46B, 2¾" single.

MODEL 47B

MODEL 47B, 1⅞" case to AND 10403
—70 to +150°C AN 5790-6 or AN 5790T6
0 to +125°C Oil Temp. . . .
—50 to +50°C Air Temp.

MODEL 77B

MODEL 77B dual, 2¾" case to AND 10403
—70 to +150°C AN 5795-6 or AN 5795T6
+30 to +230°F Oil Temp. . . .
+100 to +300°C Cylinder Temp.

FOR BEST RESULTS USE *LEWIS* THERMOCOUPLES AND *LEWIS* BULBS WITH THESE INDICATORS

THE LEWIS ENGINEERING CO.
NAUGATUCK, CONNECTICUT

Manufacturers of Complete Temperature Measuring Systems for Aircraft

and engine-driven pumps, were mounted on each firewall. Because the engines were not installed, the exactor rigs were actually used to supply fuel under pressure.

In most of the runs, only 10% of the fuel was used; the supply which would normally go to the engine was returned to the tank.

The mockup can be tilted to attitudes which could be obtained in sustained flight. The fuel system tests were made for mockup angles of 15-deg. climb and 3-deg. dive, in combination with 5-deg. sideslip both left and right.

There were two phases to the system tests. Flows were measured for gravity feed and were repeated for booster pumps on. The tests were again repeated with the balance valves open and cross feeds were checked.

The test flow rate was 420 gph. per engine, which represents 125% of the maximum fuel flow of 336 gph. per engine.

Although the fuel venting system was checked, final proof will not be obtained until flight tests which will show whether the atmospheric vent is correctly vented.

▶ **Pressure Refueling**—The Britannia can be pressure refueled, and tests of the system were also made on the mockup. A safety valve in each bag cell relieves any excess pressure. The bags are located between the main spars, and expansion of the cell would produce what Bristol calls "expensive results."

Fuel on the Britannia can be either jettisoned or unloaded. The outlet for jettisoning is on the under side of the wing trailing edge. It is retractable and power-operated. The functional mockup made it possible to check the system, but only flight tests can give the final answer. After jettisoning, about 600 gal. remain in the tanks.

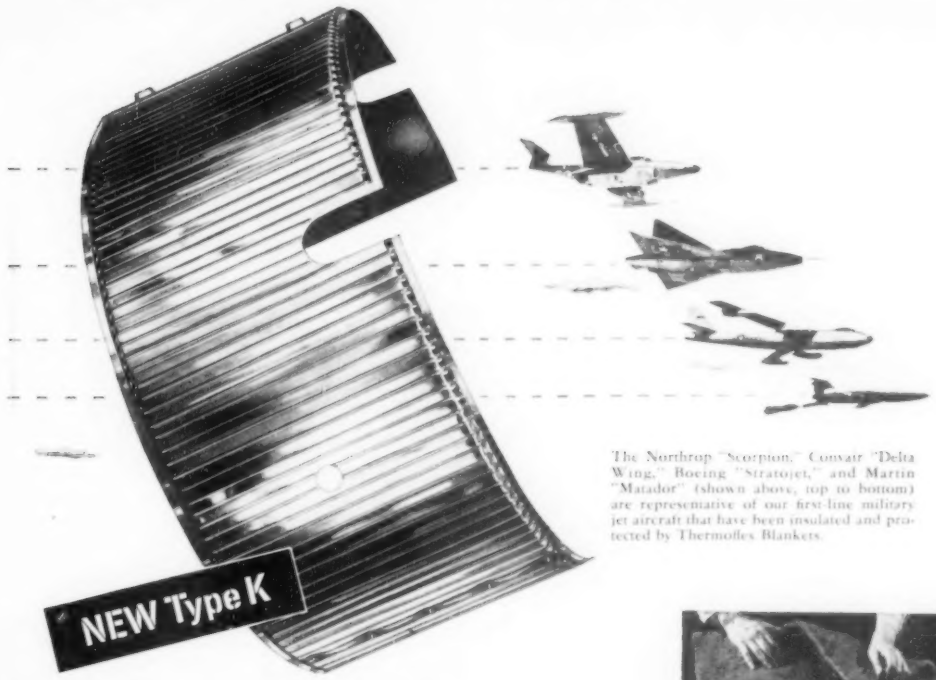
If a last-minute change in flight plan makes it necessary to unload fuel, the pressure refueling points are used. For maximum flow, the booster pumps are switched on; otherwise, gravity suffices. With booster pumps on, the fuel unloading rate was 2,700 gph.

By means of "ingenious design detail," it has been possible to get the quantity of undrained fuel down to less than one gallon for the whole system.

▶ **Spec Progress**—In addition to the tangible progress in the hardware stage, Bristol has shown some new information on the Britannia.

The Britannia has a "revenue index" of 4,000 ton miles per hour; this is the total potential capacity of the airplane. (Actually, if one uses the quoted payload of 25,000 lb. and the quoted cruising speed of 360 mph., the revenue index comes out to be 4,500 ton miles per hour, using the 2,000-lb. ton. With the British long ton of 2,200 lb., the

On the latest Air Force and Navy aircraft...



The Northrop "Scorpion," Convair "Delta Wing," Boeing "Stratojet," and Martin "Matador" (shown above, top to bottom) are representative of our first-line military jet aircraft that have been insulated and protected by Thermoflex Blankets.

THERMOFLEX BLANKETS

insulate against searing heat of jet engines

JUST as the Air Force and Navy demand speed and maneuverability in their latest jet aircraft . . . they also demand safety factors such as are provided by Thermoflex® Blankets. These custom-made blankets insulate and protect both power plant and airframe against the searing heat of jet engines.

To keep pace with fast-changing requirements, Johns-Manville has recently developed a new engineering feature for Thermoflex Blankets. It is an "inside-out" construction known as Type K.

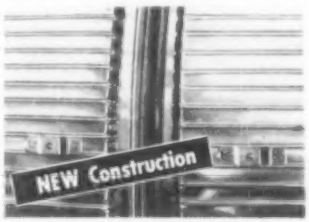
By reversing the former standard Thermoflex Blanket construction and placing the smooth foil on the *inside* and the grooved foil on the *outside* . . . tension on the inside foil permits a very snug fit. And the *entire blanket* expands circumferentially without crushing the insulation filler as the diameter of the tail pipe, exhaust cone, or afterburner expands with high temperatures.

Another major improvement in Thermoflex Blankets—made necessary by the extensive use of afterburners in jet engine design—is the new Thermoflex RF Felt. This lighter weight blanket insulation filler is made from fiberized, molten refractory minerals, and has exceptional stability at the high temperatures encountered in jet propulsion.

Thermoflex Blankets are also available in special preformed shapes to insulate, protect, and fireproof interior engine parts, heating systems, de-icing ducts, fluid storage tanks, and many other aircraft assemblies.

For further information, send for your copy of Brochure IN-136A. Address Johns-Manville, Box 60, N.Y.16, N.Y. In Canada, 199 Bay St., Toronto, Ontario.

Made of fiberized molten refractory minerals, this new, lighter Thermoflex Blanket insulation filler has exceptional stability at high temperatures. Note its flexibility.



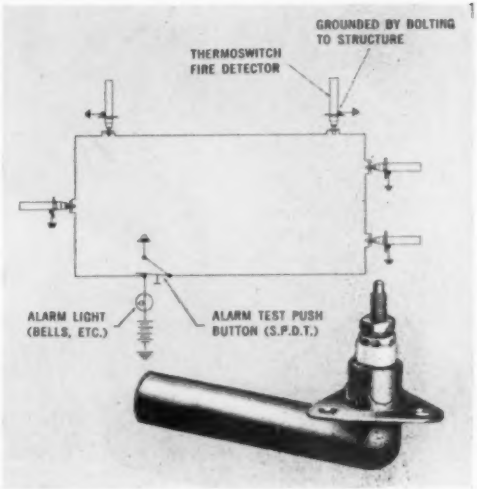
Close-up view of new Type K Thermoflex Blanket construction with grooved foil on *outside*, smooth foil on *inside*. This permits circumferential expansion of *entire blanket* without crushing insulation filler.

JOHNS MANVILLE PRODUCTS

Johns-Manville PRODUCTS for the AVIATION INDUSTRY

New Over-Heat Detector For Super Jets

EACH ADVANCE IN JET PLANE DESIGN demands more and more ingenious use of space on the part of aircraft designers. For this reason the introduction of a *right angle mount* over-heat detector by Fenwal engineers is a welcome contribution. Its terminal protrudes at a right angle from the mounting plate thus making it excellent for confined spaces.



FENWAL'S RIGHT ANGLE MOUNT OVER-HEAT DETECTOR permits easier assembly, and removes all wiring and terminal connection from the area being monitored. Uses a single wire circuit with ground return. Each detector on circuit operates independently. A double break only eliminates detectors between breaks. Push button checks entire circuit.

IN THE FENWAL METALLURGICAL LABORATORY, Fenwal engineers determine which alloy metals best meet the requirements of specific design needs. This laboratory is but one of several which help maintain high quality standards in Fenwal units. Other types of Fenwal aircraft THERMOSWITCH® units are used for heater control, safety over-heat control, cowl flap control, oil cooler control, de-icing heaters, cabin temperature control, humidifiers.

THE SHELL IS THE TEMPERATURE-SENSITIVE ELEMENT. Fenwal detectors function the *instant* surrounding air temperature reaches the alarm point. No lag . . . no false alarms. Compact, hermetically sealed, highly resistant to shock, vibration, and extreme temperature conditions. For complete data on the new right angle mount detector, as well as other Fenwal aircraft controls, write Fenwal, Incorporated, 123 Pleasant Street, Ashland, Mass.

Fenwal

THERMOSWITCH®

Electric Temperature Control and Detection Devices

SENSITIVE... *but only to heat*

revenue index is about 4,100 ton miles per hour.)

Gross weight of the airplane is 140,000 lb. (up 10,000 lb. from the figure quoted last fall); payload remains at 25,000 lb. Associated with these figures are a still-air range of 4,000 statute miles at a cruising speed of 360 mph. and a mean altitude of 30,000 ft. Maximum still-air range with standard tankage is 5,600 statute miles with a payload of 12,000 lb.

The Britannia can clear a 50-ft. obstacle in 3,700 ft. taking off against a 5-mph. wind. At a pressure altitude of 5,500 ft., this distance increases to 6,400 ft. at an ambient temperature of 80F.

Sea-level landing performance requires a distance of 2,800 ft. clearing a 50-ft. obstacle in a 5-mph. wind.

Typical loading for the Britannia: 50 passengers with 60 lb. of luggage each, 450 lb. of food, and 13,550 lb. of fuel or freight, for a 25,000-lb. total.

THRUST & DRAG

This tricky little gadget—known as "Missiletoe"—is a visible aid for lectures on autopilots and guided missiles. It's a miniature V-2 type of rocket, 15 in. long and 2 in. in diameter. It's powered by hearing aid batteries which drive two motors—one for propulsion and one for steering. William F. Carr, electro-mechanical project engineer and a member of the speakers' staff of Lear, Inc. designed and built Missiletoe in three months of spare time. Missiletoe is able to seek and find a light source; in action, it propels itself over a table-top seeking a light which simulates the bright area of a city. When it hits its target, the warhead "explodes" in a manner not specified. Aside from the educational angle, this appeals to me as one of the most intriguing toys an adult male could own. And you should have quite a struggle keeping it away from your own small boys.

Reports are that General Electric is about to lose one of its two North American B-45s to Pratt & Whitney Aircraft so that latter can use it for J-57 aerial runs. The B-45 expected to be returned to the Air Force for this transfer is one GE had been using for some time to obtain data on optimum service life of J-47 under controlled, high-utilization condition — probably leading to extensive information relevant to future commercial jet-transport operation. The other B-45, which GE will retain, was recently received from AF for test vehicle use with company's J-73 slung from the bomb bay as extra engine. —DAA

Get in the Scrap—Turn Yours in for Defense

make a jet fly better?

Just a small flow-detector tab below the leading edge, yet this vane gives any airplane better landing, flight, and maneuvering characteristics, regardless of size or weight. It's part of the stall sensing unit of the Safe Flight pre-stall instrumentation system.

Regardless of load, speed, acceleration, or flap position, this detector gives infallible pre-stall warning at a precisely determined margin. It actuates the Safe Flight control shaking device which perfectly simulates natural buffeting so difficult to achieve in modern, rigid, high-speed aircraft. Equally important, it helps the pilot obtain maximum performance by supplementing his perceptive skill in the region of $C_{L(max)}$.

Why not let our engineering staff discuss what stall instrumentation can do to improve your designs? Your inquiry will be welcomed.

SAFE FLIGHT SYSTEMS ARE INSTALLED ON THESE AIRCRAFT

TRANSPORT Convair 240 Douglas Super DC-3 Northrop C-125

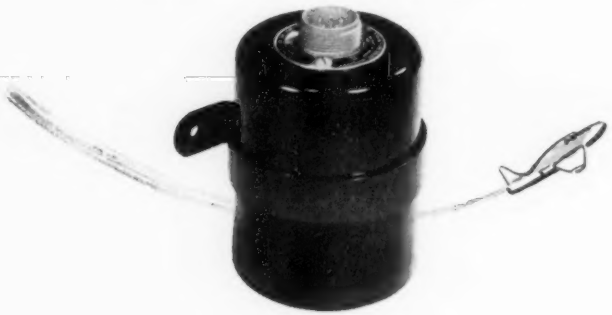
CIVILIAN Aeronca (all models) Beech 18, 35 Cessna (all models) Piper (all models)

TACTICAL AIRCRAFT Chance Vought F7U series Douglas AD-3W series, F3D series Grumman (all models) McDonnell F2H series Northrop F89, YRB-49 series

SAFE FLIGHT INSTRUMENT CORPORATION
White Plains, New York
PIONEERS IN STALL INSTRUMENTATION

Differential
PRESSURE SWITCHES

FOR SAFER AIRCRAFT TODAY AND TOMORROW



A wide selection of precision-built differential pressure switches is available for your aircraft today—and for those still "on the boards."

Manning, Maxwell & Moore switches now provide maximum safety on many aircraft. They sense fuel, oil and air pressures, flash warning lights of many kinds, actuate water and alcohol injection pumps, and perform numerous other tasks.

Flexibility of switch design permits engineering to your specific needs. All models have a highly sensitive differential pressure sensing element with a non-metallic limp diaphragm. Accurate operation at any predetermined pressure within range and a minimum life of 100,000 cycles are assured. Switching is through SPDT contacts, microswitches or relays, depending on load characteristics. Pressure differential and range are internally adjustable.

Rugged construction provides functional perfection throughout the vibrational range of modern jet and propeller-driven aircraft. All models meet environmental requirements of MIL-E-5272 specifications. Effects of ambient temperatures from minus 65°F. to plus 165°F. are engineered out of all switches; some models withstand up to 250°F.

Let us help you build better, safer aircraft. Write today for engineering counsel on your specific pressure switch application problems. No cost or obligation.

AIRCRAFT PRESSURE SWITCHES

A Product Of

MANNING, MAXWELL & MOORE, INC.

250 East Main Street, Stratford, Connecticut

Test Stand Checks Pneumatic Units

A new test stand for making functional checks of pneumatic system components on aircraft and guided missiles is in production at the Gardena, Calif., plant of Sprague Engineering and Sales Corp.

The test stand, designated Model S-421, is a package unit in a welded steel cabinet 6 ft. wide, 3 ft. deep and 6 ft. 2 in. high. The test area may be closed off completely by sliding steel doors, 4 in. thick. And to observe the tests, a 2-in.-thick, bullet-proof glass window 20 in. square is provided. With doors closed, all controls can be operated.

Three separately regulated test outlets are provided, with ranges of 0—200, 0–2,000 and 0–6,000 psi. Two flowmeters for measuring leakage have ranges of 0.01 to 0.24 cubic feet per minute and 2 to 28 cubic inches per minute.

To get maximum pressure of 6,000 psi., the customer furnishes a 2,000 psi. nitrogen bottle and boosts the supply pressure with a Sprague Model S-3600-WB air booster. This unit operates from shop air supply at 100 psi., and is water cooled and lubricated.

Pressures at the test stand inlet may vary downwards from standard cylinder supply pressure of 2,000 to 2,200 psi. to 500 psi.

It is possible to let supply pressure drop below the 500 psi. level, but then the booster efficiency is lessened proportionately.

Prices and delivery quotations can be obtained from Sprague Engineering and Sales Corp., 1144 W. 135th St., Gardena, Calif.

"Let's check that blueprint again, huh?"

Boeing Plane Talk (Wichita)

to meet rigid aircraft requirements!

...check

EMC and CYCLOHM

FRACTIONAL H.P. MOTORS

Universal and Direct Current
1/1000 to 1/2 h.p.
Shaded Pole
1/2000 to 1/15 H.P.
Induction Types
1/1400 to 1/4 h.p.

EMC and CYCLOHM fractional H.P. motors, available with or without gear units, permit a wide range of use and versatility to meet your small motor requirements.

EMC model 100 (illustrated) is specifically designed for aircraft applications rated from 1/13 to 1/100 H.P.

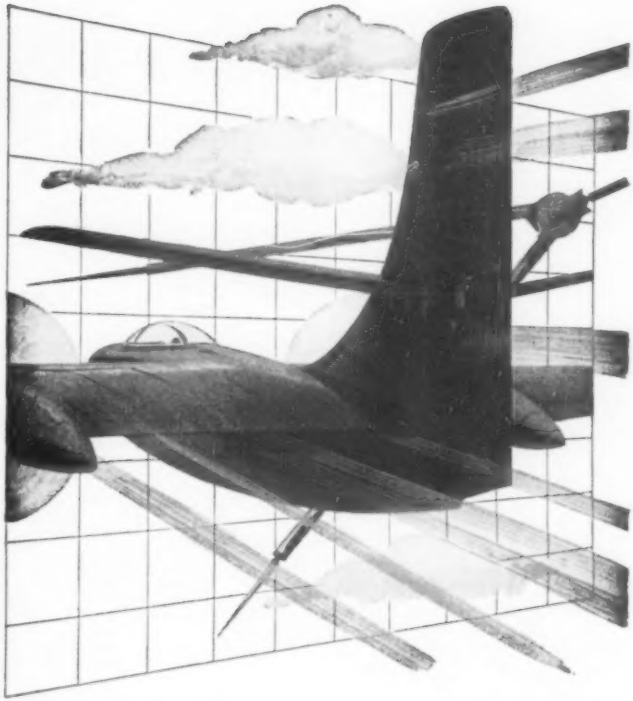
Check the partial list of applications below, and write for our catalog and full information. Write today!

✔CHECK EMC AND CYCLOHM FOR THESE AND SIMILAR APPLICATIONS

Autopilot Systems	Cabin Supercharger
Shut-off Valves	Wing Flaps
Master Direction Indicator	Trim Tabs
Air Distribution System	Rudders
Cowl Flaps	Ailerons
Cabin Air Blowers	Elevators
Landing Gears	Bomb Releases
	Gun Charging Motor
	And many more.

Dept. A
HOWARD INDUSTRIES, INC.
RACINE, WISCONSIN
DIVISIONS:
EMC ELECTRIC MOTOR CORP.
CYCLOHM MOTOR CORP.

HOWARD



Bristol Automatic Control

GUARDS AIRCRAFT SAFETY AND OPERATING EFFICIENCY

Leading aircraft manufacturers use Bristol Automatic Precision Control Equipment on fighter planes, bombers and transports.

Products of over 60 years of Bristol pioneering in the field of precision instruments, they have proved their merit under exhaustive flight tests in extreme climates and at high altitudes.

What are your instrument control requirements? Bristol's Aircraft Division is especially geared to design and produce aircraft control devices such as engine temperature controllers, timers, and other electronic and electro-mechanical control devices.

The Bristol Company is a leader in the development of instruments and devices for indicating, recording and automatically controlling temperature, pressure, flow and other fundamental quantities.

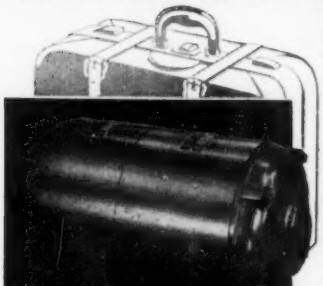
With aeronautical development proceeding at a rapid pace, Bristol engineering and production facilities are available to solve *your* aircraft control problems.

There are Bristol branch offices in 26 principal cities and Bristol factories in Chicago, San Francisco, Toronto and London. Address inquiries to The Bristol Company, Aircraft Equipment Div., at 130 Bristol Rd., Waterbury 20, Conn.

BRISTOL

FINE PRECISION INSTRUMENTS FOR OVER 60 YEARS

smaller than a suitcase



. . . and almost as portable!

AMERICAN ELECTRIC

400 Cycle

MOTOR ALTERNATOR

WEIGHT: Approx 125 lbs.
SIZE: 22" x 12" x 12"

Designed for production and laboratory high frequency power supply requirements. STRONG—SIMPLE—INDESTRUCTIBLE CONSTRUCTION—No delicate moving parts, brushes or springs to wear out or maintain.

Replaces single large, hard-to-get H-F power supply serving multiple purposes . . . *A bank of these compact, flexible units costs far less, provides individual portable power sources for each project, avoids downtime hazards of single unit!*

Meets power supply requirements for AN-E-19 equipment.

OUTPUT: Up to 1000 Watts single phase 115V or up to 1800 Watts three phase 115/200V. Input: 60 cycle AC.

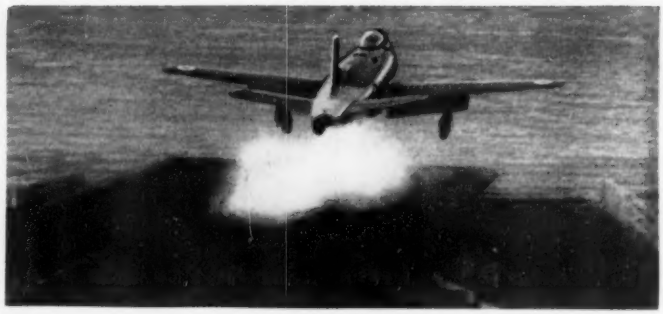
Total harmonic content under 5%; ± 1% voltage regulation.

WRITE FOR DETAILS!

Larger capacities available.

AMERICAN ELECTRIC MOTORS
TRADE MARK

4811 Telegraph Rd.
Los Angeles 22,
California



Royal Navy Tests Steam Catapults

A high-performance steam catapult, designed for launching the most modern carrier aircraft at higher speeds, has been developed by the British Admiralty and will soon be demonstrated to the United States Navy.

The new unit has been tested for the past 14 months in the waters around England, and further trials with U.S. cooperation are scheduled.

Now fitted to HMS Perseus, light fleet carrier unit of the British Navy, the catapult is slated for future installation in carriers of the Royal Navy and the Royal Australian and Canadian Navies if the present tests are successful.

► **Basic Scheme**—A slotted cylinder is the major unit of the catapult. The aircraft to be thrown off is attached to a hook which is fastened to a piston. This piston is driven through the slotted cylinder by high-pressure steam from the ship's boilers.

(The wartime German V-1 was launched by a somewhat similar device in which the steam came from the decomposition of concentrated hydrogen peroxide.)

Inventor of the catapult is a volunteer reserve officer in the Royal Navy, Commander (E) C. C. Mitchell, of Messrs. Brown Brothers and Co., Ltd., of Edinburgh, Scotland, who designed and built the catapult in HMS Perseus.

In that installation, it was necessary to build a raised section on the flight deck forward of the island, and to install compressors and certain other machinery on the hangar deck. Normally, such gear would be placed in various locations around the ship, and the British say that it takes up less space than the conventional types.

Steam requirements for sustained operations are considerable, but trials have shown that the demand upon the boilers can be met without interfering with satisfactory operation of the ship.

► **Aircraft Launched**—The first piloted aircraft to be launched from the new catapult was a Fairey Firefly, two-seater propeller-driven plane. The Vickers Supermarine Attacker, single-seat turbojet fighter, was the first jet job to be catapulted.

Up till now, 127 piloted planes have been slung off over the Perseus' bow.

In addition about 1,000 dead weights and pilotless aircraft have been launched.

And the Firefly and Sea Fury have been launched from the Perseus when the ship was stationary in the water.

U. S. Navy tests are to be made at Philadelphia and Norfolk Navy Yards with dead weights and fittings approximating service aircraft. If these tests go well, the next step will be the launching of U. S. Naval aircraft.

It's . . .
KESTER
FLUX-CORE
SOLDER

IN DEMAND

IN DEMAND and used by leading aircraft instrument manufacturers . . . aircraft electronic equipment producers.

Write for your copy of our Technical Manual.

KESTER SOLDER COMPANY
4230 Wrightwood Ave., Chicago 39
Newark 5, N. J. • Brantford, Can.

KESTER SOLDER

Aircraft Parts by Eaton

combine outstanding developments in design, metallurgy, and production engineering

Since pioneering the development of the sodium-cooled valve in cooperation with the Army Air Force at McCook Field in 1922, Eaton has made many important contributions to the aircraft industry in design, metallurgy, and production. Eaton's understanding of the problems peculiar to the aircraft industry has led to the development of unique, high-volume production facilities for the manufacture of parts which meet exacting aircraft standards of quality.

You can utilize Eaton's long experience in this field by giving our engineers an opportunity to work with yours in the early stages of design.

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

SAGINAW DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters Valve Seat Inserts Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

CLEVELAND PNEUMATIC - *pioneers and leaders in Aircraft Landing Gear*

EXPERIENCE - KNOW-HOW - EQUIPMENT

Cleveland Pneumatic's plant today covers this large area; inset above is a view of the main entrance.

Cleveland Pneumatic's plant in 1928, shortly after landing gear production was started.

Large, modern plant equipped with finest laboratory and manufacturing facilities

Aircraft landing gear and ball-bearing screw actuators are the sole products of this plant comprising approximately six acres of specially designed brick-and-steel buildings. Equipment includes the latest in production tools, testing devices and laboratory facilities.

Starting with the manufacture of the *first* air-hydraulic landing gear 26 years ago, plant capacity has steadily increased — last year about 35%.

Even more important than the physical facilities in the leadership of Cleveland Pneumatic landing gear is our large staff of experienced engineers. Follow our ads for more information regarding the Cleveland Pneumatic story.

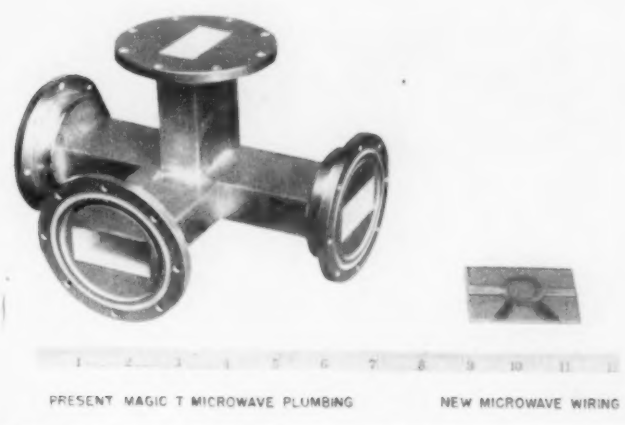
THE CLEVELAND PNEUMATIC TOOL COMPANY

CLEVELAND 5, OHIO

Established 1894

AVIONICS

GROWING use of avionics in high-speed planes such as these F-94's, makes . . .



SMALLER and lighter avionics units, like radar waveguide shown, a must.

IRE Talks Point To Weight Saving

New ideas on smaller electronic units, simplified maintenance described; tiny transistors shown.

By Philip Klass

New techniques and ideas for reducing the weight and complexity of avionic equipment, increasing its reliability, simplifying internal fault isolation, and for applying the new wonder transistors to electronics equipment were described at the recent annual convention of the Institute of Radio Engineers in New York City. More than 28,000 engineers and electronics specialists attended the four-day session.

Papers of particular interest to the aviation industry indicated that:

- Fly-weight, miniature, long-life transistors have already begun to replace vacuum tubes in some military equipment.
- Military aircraft may soon be using a new space-saving modular-type rack to mount avionics equipment, housed in new case shapes and sizes.
- Certain improvements outside of elec-

Field Test Positions in CALIFORNIA on Guided Missiles

ENGINEERS

Electronic
Aeronautical
Servomechanical
Telemetering
Mechanical

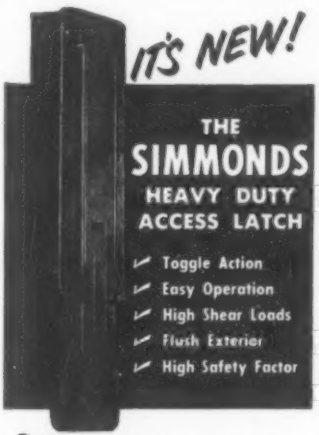
TECHNICIANS

Electronic
Mechanical

APPLY NOW **for this long-term testing program to:**

FIELD TEST DIRECTOR
BELL AIRCRAFT CORPORATION
NAVAL AIR MISSILE TEST CENTER
POINT MUGU
PORT HUENEME, CALIFORNIA

BELL Aircraft CORPORATION



IT'S NEW!

THE **SIMMONDS** HEAVY DUTY ACCESS LATCH

- Toggle Action
- Easy Operation
- High Shear Loads
- Flush Exterior
- High Safety Factor

DESIGNED **for flat panels, and for uses on cargo doors, radomes, armament compartments and other access panels. Also adaptable to a wide variety of industrial uses. (Special tail pieces can be designed for particular uses.) For information on Simmonds Cowling Latches and Access Latches write for bulletin.**

SIMMONDS AEROCESSORIES, INC.
Simmonds Products, Inc. Tarrytown, N. Y.

to identify SPECIFY Metal-Cal NAME INSTRUCTIONS

THE PERMANENT SELF-ADHESIVE IDENTIFICATION DEVICE

FOR ECONOMY!

A METAL-CAL is a .003" thickness of aluminum foil—anodized, dyed and backed with a high tensile bonding material. Easily applied to any smooth, cohesive surface. NO DRILLING, SCREWS or RIVETS required.

FOR LONG LIFE!

Letters and characters on a METAL-CAL surface remain clear and sharp under the most trying conditions of weather and wear . . . live as long as the metal itself. A METAL-CAL won't PEEL, CHIP or CRACK.

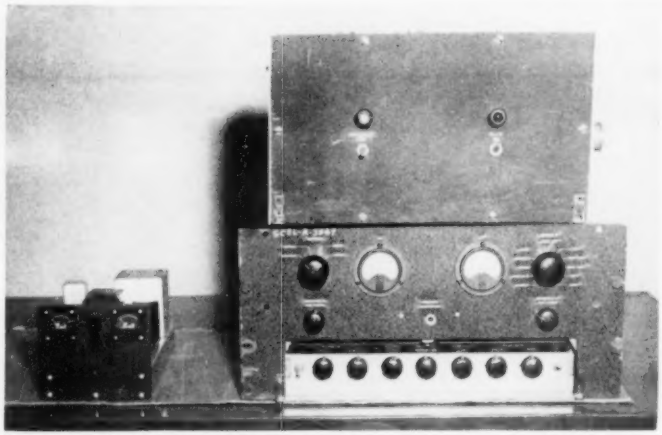
THE NEW TREND!

Superior to both decals and conventional nameplates, METAL-CAL is invading new industries every day. METAL-CAL may solve YOUR identification problem. For further information and quotes, address all inquiries to:

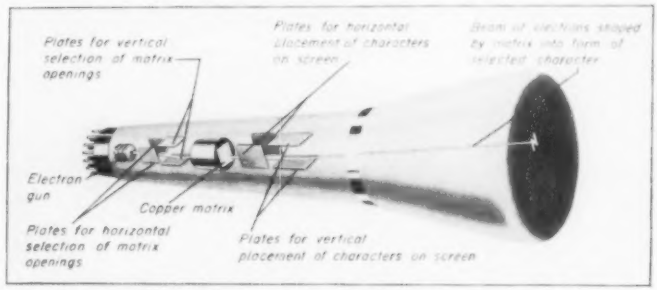
Metal-Cal DIVISION C & H SUPPLY CO.

Dept. G-4 Main Office and Plant
Boeing Field, Seattle 8, Washington
Sales Office
1725 E. 2nd St., Wichita, Kansas
Sales Office and Plant
415 E. Beach Ave., Inglewood, Cal.
Sales agents in all Principal Cities

*Trade Mark Registered



NEW and old radio-teletypewriter converters. Miniature (left) uses transistors.


Plates for vertical selection of matrix openings
Plates for horizontal placement of characters on screen
Beam of electrons shaped by matrix into form of selected character
Electron gun
Copper matrix
Plates for horizontal selection of matrix openings
Plates for vertical placement of characters on screen

CATHODE ray tube can spell out words at rate of 10,000 characters per second.

tronic equipment could mean large savings in weight and complexity of electronic gear.

- Extremes of temperature, altitude and humidity are not in themselves solely responsible for environmental failure of avionics equipment.
- A small increase in allowable operating temperatures of avionics components means sizeable weight reduction in cooling equipment.
- Close integration liaison between military, airframe and avionics organizations must begin early in an airframe program.

In other symposium papers, new equipment or techniques were described which:

- Convert electrical voltages into words or multi-place numerals on the face of a cathode ray tube at rates up to 10,000 characters per second.
- Measure cloud height in 1/12 the time of existing equipment.
- Automatically determine wind direction and velocity.
- Should greatly reduce the weight and size of airborne radar "plumbing."
- Quickly pinpoint the source of trouble in electronic equipment.

▶**Among The Exhibits**—A popular manufacturer's exhibit with aviation people was the Collins Radio demonstrator of their new Flight System (course indicator, approach horizon, steering computer, etc.). Visitors could "fly" the demonstrator on omnirange or make an ILS approach. An adjoining plotting board (similar to plotter used with a Link trainer) made a continuous plan view record of the flight.

Collins also displayed their new lightweight ARN-19 military navigation receiver for VOR and ILS localizer. Miniaturized and sub-miniaturized construction of the new unit reduces its weight to about half that of the functionally similar ARN-14 receiver in current use. The ARN-19 has wiring panels which can be quickly swung into an exposed horizontal position for easy service and maintenance.

Federal Telecommunications Laboratories displayed their new Distance Measuring Equipment (DME) airborne interrogator-responsor which they produced for the Civil Aeronautics Administration. The unit weighs about 57 lb.

Altogether, more than 350 manufacturers displayed their electronic wares on four floors of Grand Central Palace.

▶**Technical Discussions**—Two of 36 IRE sessions were devoted specifically to military or avionics subjects. These were on:

QUALITY... the Most Vital Component of All!

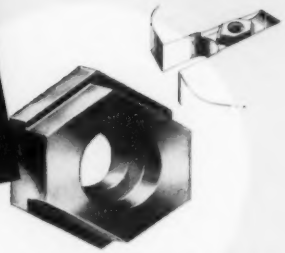
When you have a prescription filled, you naturally assume that it will be "just what the doctor ordered"... its *quality* you take for granted. And you can, because your pharmacist never does. To him, quality and accuracy are virtually a sacred trust. This same feeling prevails at Eclipse-Pioneer. Long ago, Eclipse-Pioneer developed and instituted a quality control system so precise it has become literally the standard by which the "standards" are judged. Every part and process from raw material to finished product is tested and checked with the finest equipment and methods available today. Thus, in specifying the vital instruments and accessories for your planes, you can be certain of the highest quality it is humanly possible to deliver when you call on Eclipse-Pioneer.

ECLIPSE-PIONEER DIVISION OF **Bendix** AVIATION CORPORATION

TETERBORO, NEW JERSEY

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.

VLIER
FIXTURE KEYS
KEEP IDLE
MACHINES BUSY



MILLED SLOT FIXTURE KEY

Vlier Multi-Dimensional
Fixture Keys are simple, counter-bored hex nuts, having step-cut sides. They are milled from oversize stock to different cross dimensions which are accurate to ± .0005". By placing these keys in your fixtures, they can be accurately positioned and worked on any idle machine without expensive re-work time. Each key fits three different slot dimensions and eight combinations of sizes are available. All are rust-resistant. Dimensions remain accurate. Truly, they are inexpensive time-savers.

REAMED HOLE FIXTURE KEY

Reamed Hole Fixture Keys
were developed for users who do not want to use milled fixture key-ways. These units have the same accuracy and positive alignment as Vlier milled slot fixture keys. Ask your nearby Vlier distributor to demonstrate their many time-saving features. Send today for Catalog No. 50.

VLIER MANUFACTURING CO.
4552 BEVERLY BLVD., LOS ANGELES 4, CALIF.
Manufacturers of Spring Plungers, Torque Thumb Screws, Toggle Pads, Spring Stops.

• **Integration** of electronics and airframe design.
• **Reliability** of military electronic equipment.

Some of the papers in other sessions were on new techniques in microwave propagation, servo mechanisms analysis, computers, or telemetering of information, subjects which find application in the avionics field.

► **Avionics-Airframe Integration** – The new proposed type of modular avionics equipment case and rack construction, contoured to follow fuselage curvature has already been adopted by the AF's armament lab and is being considered by their equipment laboratory, according to F. E. Wenger, chief of the Components Development Division of the AF's Wright Air Development Center who described the new development. If adopted, it will mean industry-wide changes in design and layout of avionic equipment.

Designed to replace the long-standard JAN-C-172 spec., the new modular case sizes will come in three widths: 5¾ in., 12¼ in. and 18¾ in., according to Wenger. Any case depth dimension up to 8 in. is permitted; beyond 8 in., lengths can vary in 4 in. increments to a maximum of 20 in. Case height can vary in ¾ in. increments.

By providing the rack with isolation mounts, to eliminate their need on individual component cases, considerable "sway" space between individual component cases can be saved. However isolation mounts can be used on individual cases if required, including the new "center-of-gravity" type of mount.

The proposed new rack design also accommodates cylindrical (pressurized) units and will have standard quick-disconnect type electrical connectors to mate with those on the rear of each case.

► **Integration Problems**—Sizeable reductions in weight and complexity of avionics equipment would be possible if voltage and frequency regulation of the airborne power generators were improved, say to ± 1%, A. F. Coombs said. The design and weight of nearly every piece of avionics equipment is penalized because of wide tolerances on voltage and frequency regulation and because it must withstand occasional abnormally low power supply frequency, he pointed out.

Coombs, of General Electric, said that the new importance of avionics fire control, intercept and navigation equipment to airplane mission demands close liaison between military, airframe, and avionics engineers from the very inception of a new airframe program.

► **Environmental Problems**—Many environmental failures of avionic equipment are due to rapid transitions between extreme combinations of temperature, humidity and altitude, and not just to the extremes themselves, according to

ENGINEERS

wanted at once

for

LONG-RANGE MILITARY AIRCRAFT PROGRAM

by

NORTH AMERICAN AVIATION, INC.

Los Angeles, California

Columbus, Ohio

Unusual opportunities for Aerodynamicists, Stress Engineers, Aircraft Designers and Draftsmen, and specialists in all phases of aircraft engineering. Engineering skills other than aircraft may be adaptable through paid training program. Also openings for

Recent Engineering College and Technological Graduates

Long-range military program offers fine chance for establishing career in aircraft while aiding defense effort. Transportation and established training time paid. Salaries commensurate with experience and ability.

Please include summary of education and experience in reply to:

Engineering Personnel Office
SECTION 3

NORTH AMERICAN AVIATION, INC.

Los Angeles International Airport
Los Angeles 45, Calif.
or
Columbus 16, Ohio

LET'S MAKE IT CLEAR...

Low pressure laminates are NOT substitutes for the more commonly known materials. They are made of reinforced Fiberglas, nylon and the other modern materials, are often superior on a strength-weight basis and possess a unique combination of properties . . . physical, electrical, thermal and chemical.

LIGHTER THAN ALUMINUM . . . STRONG AS STEEL
REINFLASTICS are being produced in large quantities for all branches of the aircraft industry . . . in flat sheets for backing board and cargo liners . . . in matched die molding for electrical boxes and covers, fair leads and precision parts . . . in vacuum bag molding for fin tips, gap bands and ducts.

STRUX (CCA) Cellular cellulose acetate
Our expanded plastic that is lighter than balsa wood but of great structural strength, is being used for gun plugs for jet fighters . . . and, as a core between REPCO Panels in sandwich construction for overhead racks, floors and filler sections.

If you want great strength combined with light weight, where your product is simple or complex, small or large, translucent or opaque, plain or colored and must adhere to the closest of tolerances, you can rely on Russell. Consult us now and ask for samples of REPCO and STRUX.

Repco Plastics by Russell
REINFORCED PLASTICS CORP.
TWO SOUTH 13th STREET • LINDENHURST, L.I., N.Y.

Associated Companies	STRUX CORPORATION	Lindenhurst, L.I., N.Y.
	AIRCRAFT SPECIALTIES CO., INC.	Hicksville, L.I., N.Y.
	REGAL PLASTIC COMPANY	Kansas City 6, Missouri
West Coast Representative	ALLIED PRODUCTS ENGINEERING CO.	Los Angeles 43, California
Distributor	WESTERN FIBERGLAS SUPPLY CO.	Los Angeles 13, California

D. T. Geiser of Boeing Airplane Co.

Although test chambers which permit simultaneous control of temperature, humidity, and altitude are costly, Geiser urged the use of "3-dimensional" cyclic testing under actual in-flight use conditions to reduce environmental failures.

► **Heat Dissipation**—The weight of an airborne refrigeration unit required to cool 5 kw. of avionics equipment can be reduced from 80 to 30 lb. if avionic equipment can operate at 71C instead of being limited to 55C.

Louis Possner of Hughes Aircraft in his paper on heat dissipation problems cited this example to show the importance of higher temperature avionic components. Possner recommended using an air cycle refrigeration unit for speeds above 600 mph. and altitudes greater than 50,000 ft. where ram air temperatures are too high for cooling use.

Possner said that most organic paints of any color are as good heat radiators as the commonly accepted black. (This could mean that avionic equipment will blossom out in a variety of colors for functional coding.)

► **High-Temp. Components**—A new miniaturized potentiometer operable between −60C and 200C, and a new tantalum capacitor useable between −60C and 160C were examples of new higher temperature components described by F. E. Wenger in his previously cited paper. One of the functions of the WADC Components Development division, which Wenger heads, is to sponsor the development of new, smaller, more reliable avionic components.

Wenger justified the practicality of a 200C temperature goal by saying that the Air Force is currently encountering temperatures of 170C—and trying to meet them with 85C components. (A member of the audience from the Strategic Air Command questioned whether the −65C value was low enough, citing a SAC-measured temperature of −84C).

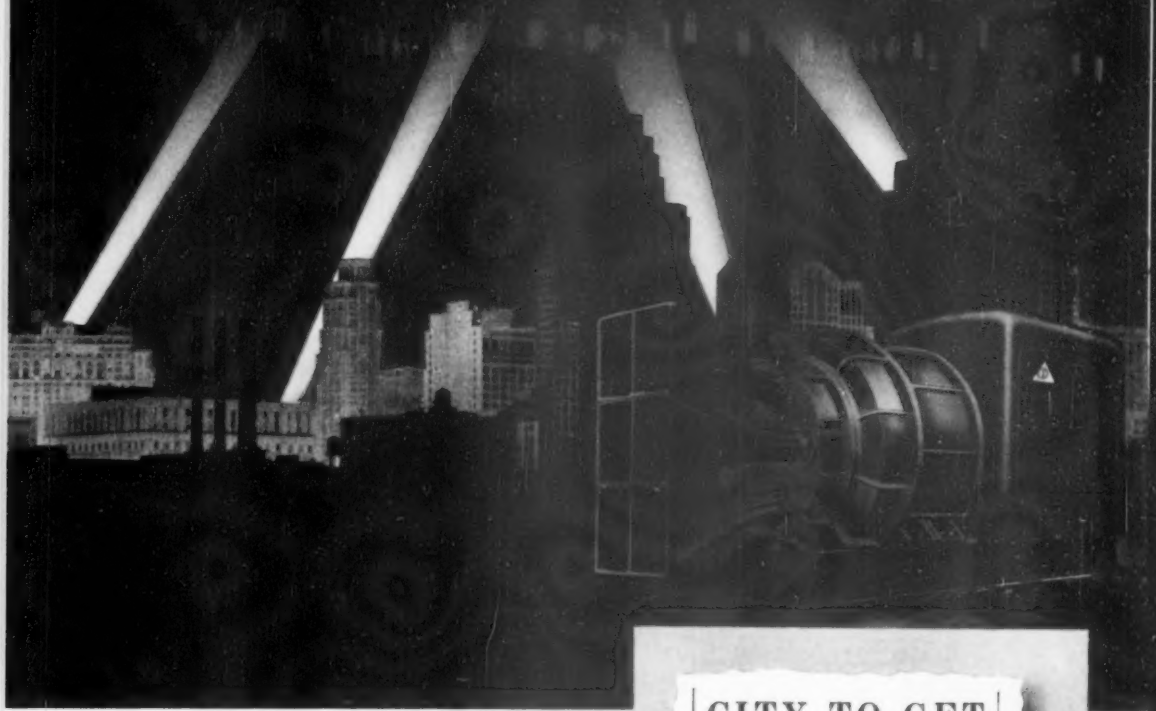
It requires up to seven years to develop and place a new component in use, according to Wenger, because such developments require research into new materials and processes. Wenger said the Air Force currently has more than 150 component development projects under way.

► **Equipment Reliability**—Unitized construction of military electronic equipment does not require a significant increase in the number of components or in equipment size, according to W. D. McGuigan of the Stamford Research Institute. He described an existing radar set which the institute under Navy sponsorship has experimentally converted to unitized construction of functionally associated circuits and which includes built-in fault-isolating equipment.

The test equipment enables a mainte-

CHRYSLER AIR RAID SIRENS

Selected to Warn Arsenal of Democracy



DETROIT IS PREPARING WITH 20 CHRYSLER SIRENS

As guardians of America's primary target, Detroit Civil Defense Officials are acutely conscious of their city's importance to Civil Defense. They are protecting their homes, children and factories with a modern, up-to-date Air Raid Warning System. They are installing Chrysler Air Raid Sirens. Here's why:

The *new* Chrysler Air Raid Siren produces the loudest warning sound ever achieved for modern production. It is powered by a new 180 horsepower V-8 Industrial engine, making it *independent of vulnerable central power systems.* One or any number sirens may be *remotely controlled* from a central control station if desired. It is clearly recognized over a diameter of 8 miles . . . *and it is the least expensive, 138 decibels (100 ft. from threat) of warning sound on the market today!*

For complete information, specifications and availability for your city, town or industrial plant write: ***Marine and Industrial Engine Division, Chrysler Corporation, 12201 E. Jefferson Ave., Detroit 31, Michigan.***

CHRYSLER

HORSEPOWER WITH A FIGHTING HEART

CITY TO GET RAID SIRENS

First Warning Units to Be Installed in March

Detroit's civil defense program took a step forward Saturday as arrangements were made for delivery and installations of a siren-warning system and the first emergency medical supplies began arriving for distribution to casualty care stations.

Brig. Gen. Clyde E. Dougherty, director of the Detroit Office of Civil Defense (OCD) said the first two of 20 sirens would be installed early in March.

The first installations will be on top the Sheraton-Cadillac Hotel, for the downtown area, and the General Motors Building, for the New Center area.

The siren committee of the Detroit OCD decided to use a new type 180 horsepower unit manufactured by the Chrysler Corp. The choice was made after more than a year of study and comparisons of various warning systems.

Dougherty said about $100,000 was saved by waiting for the development of the new and better siren.

He estimated that the complete warning system would cost about $200,000, half of which is Federal funds and half City. All but two of the powerful sirens will be placed on roofs of fire stations.

All sirens will be activated from remote controls.

Development Center
...for Engineering
to the Nth power!
The Convair Engineering Development Center — keystone of a vast expansion program for national defense — is now in operation at San Diego. The Center sets a new standard for "under-one-roof" integration of engineering design, research, development and administration.
It is geared to implement Convair's leadership in guided missiles, electronics, atomic projects, supersonic aircraft, jet bombers and water-based planes.
This Engineering Development Center — and far-reaching advancements at other Convair divisions — are all part of engineering that aims at the maximum ... the Nth degree of air power ... the Nth Power!
IN THE AIR IT'S
CONVAIR
SAN DIEGO AND POMONA, CALIFORNIA
FORT WORTH AND DAINGERFIELD, TEXAS
CONSOLIDATED
VULTEE AIRCRAFT
CORPORATION

☆ ☆ CONVAIR IS ADDING ANOTHER 1½ MILLION SQUARE FEET OF FLOOR AREA TO ITS PLANT FACILITIES . MAKING A TOTAL OF MORE THAN 9 MILLION SQUARE FEET DEVOTED TO RESEARCH AND PRODUCTION PROJECTS FOR AIRCRAFT, GUIDED MISSILES AND ELECTRONICS!

nance man quickly to measure significant voltages and waveforms in the transmitter, receiver, video circuits, or power supply, by positioning several selector switches. Switch positions are coded to show corresponding color-coded voltage ranges on the test meter which should be obtained if the circuit under test is operating properly.

Where waveforms are to be observed on a cathode ray tube, miniature sketches of the desired waveform are shown opposite appropriate selector switch positions.

▶ **Missile Problems**—It's much harder to pinpoint failures in missile avionics than in aircraft equipment because the missile carries no observer and is destroyed on impact, Capt. A. C. Packard, head of the Navy's Air Missile Test Center at Point Mugu told his audience.

The best method devised to date to improve missile equipment reliability is to subject it to ground test conditions which are far more rigorous than those which can be expected during the missile's flight. But this isn't as easy as it sounds.

Sometimes flight conditions are far worse than the engineers expect. Capt. Packard cited one example of unexplained avionics equipment failure which was finally traced to a sudden transient acceleration peak at the instant of burn-out which far exceeded maximum anticipated accelerations.

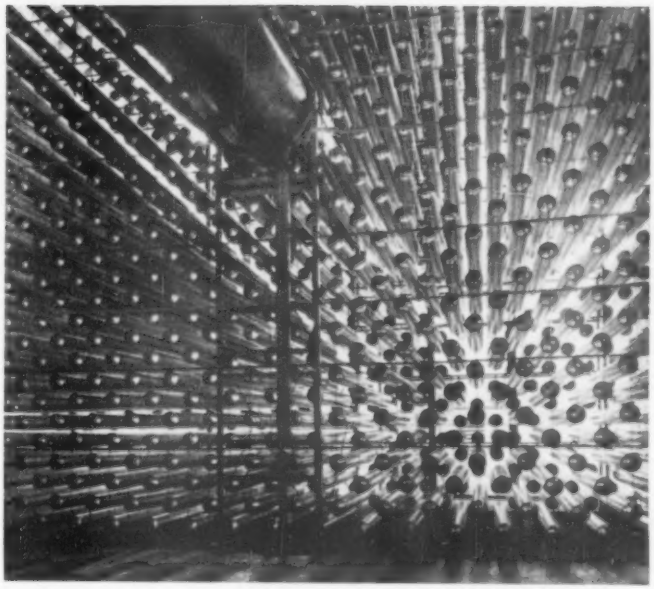
According to Packard, test missiles are currently being operated ten hours on the ground prior to launching for only a 12-second flight. Failure during the ground test requires another complete ten-hour test before firing.

▶ **New Equipment**—Vacuum tubes have been completely replaced by transistors in the new intermediate frequency converter for a radio teletypewriter which the Signal Corps unveiled and demonstrated before the IRE. The transistorized converter weighs only ⅛ as much as the vacuum tube version. Power consumption is down from 175 w. to 165 w., allowing operation from portable batteries.

A new radar and computer system which automatically determines and prints wind speed and direction has been developed by RCA and the Signal Corps for Air Force use. Operating on a 3.25-cm. wave length, the radar tracks a weather balloon carrying a radar target up to ranges of 70 mi.

Data on target azimuth, elevation, and range are fed to a computer which automatically calculates wind speed and direction, printing the information almost instantaneously.

▶ **The Charactron**—A new cathode ray tube has been developed which converts electrical voltages into a visual presentation of alphabetical or numerical intelligence and should prove useful for converting analogue or digital computer



NEW TYPE CYLINDERS ABSORB TEST NOISE

● PY-DEE Sound Absorbers are created to effectively reduce noise from jet and reciprocating engine test units. Each lightweight corrosion-resistant tube is hung independently with no contact between and is capable of withstanding high wind velocities. Closed aluminum ends are provided with studs for suspension. This system affords flexibility in spacing even after installation. Changes in attenuation characteristics may be obtained by respacing units.

Twenty thousand PY-DEE units have been delivered to Army and Navy installations and aircraft engine manufacturing plants. Increased manpower efficiency and a resultant decrease in noise fatigue are the result.

JANKE and COMPANY, Inc.
AIRCRAFT ENGINE TEST EQUIPMENT
38-44 RAILROAD AVENUE HACKENSACK, N. J.

IMMEDIATE DELIVERY from 2 of the Largest Stocks of
Aircraft Quality Steel
SHEET • STRIP • PLATE • BAR
4130 N & A AN-QQ-S-685 • 1020/25 AN-S-11 • 1095 ANNEALED AN-QQ-S-666
ZIEGLER STEEL SERVICE CO.
7022 E. BANDINI BLVD. LOS ANGELES 22, CALIF. — 310 WEST 3RD STREET WICHITA 2, KANSAS

a new
service manual for

CANNON® PLUGS

This new instruction and service manual deals with the Cannon AN-"M" Series and other Cannon Plugs having resilient inserts. Profusely illustrated, with clear, concise text, it explains step-by-step disassembly, soldering, assembly, installation, inspection and servicing procedures. If you are working with resilient insert connectors this specialized manual will be of great help. It will be of little value for conventional phenolic insert work. Please request your free copy from the Cannon Electric Department shown below.

contents include:

- Exploded views
- Table of contacts
- Removing:
  - Cable clamps
  - End bells
  - Large contacts
- Wire preparation:
  - Stripping
  - Tinning
  - Shielding
- Soldering:
  - Large contacts
  - Small contacts
- Assembly
- Seating of grommets
- Clamp saddles
- Grounding shields
- Continuity testing
- Engaging
- Safety wiring
- Special tools

CANNON ELECTRIC
Since 1915

CANNON ELECTRIC COMPANY
LOS ANGELES 31, CALIFORNIA

Factories in Los Angeles, Toronto, New Haven. Representatives in principal cities. Address inquiries to Cannon Electric Company, Dept. C-110, P. O. Box 75, Lincoln Heights Station, Los Angeles 31, California.

information into visual intelligence.

Any message or numerical data can be spelled out on the face of the new tube, developed by Convair engineers, at a rate reported to be as high as 10,000 characters per second. With an associated high-speed printing process, Convair believes this rapid visual presentation of data or intelligence can be transferred to a permanent form.

The tube contains a matrix, with letter and numeral-shaped openings, located between the tube's electron gun and its screen. The particular voltage applied to an initial electrostatic deflection system determines which letter or numeral is "squirted" by the electron beam.

After that the matrix-shaped beam is positioned in the desired spot on the screen by another deflection system, proportional to another voltage. By proper sequencing and selection of deflection voltages, any desired message can be made to appear on the tube's screen. Convair is currently applying the tube to military programs.

▶ **New Radar Plumbing**—A new type of microwave radar waveguide circuit which is considerably smaller, lighter, and less expensive than guides now in use was described in three papers presented by engineers of the Federal Telecommunications Laboratories. The new technique described is based on the use of a single wire or strip supported above a ground plane, creating in effect a parallel wire system with perfect symmetry.

The authors said that the new microwave wiring can be produced directly from wiring diagrams by etching the circuits on a dielectrically coated base plate. They reported that the resulting equipment is several hundred times lighter and much more compact than present-day microwave plumbing.

For example, they cited the much-used "Magic Tee" waveguide which weighs 15 lb. and could be replaced with a new ground-plane circuit weighing only a few ounces.

▶ **New Ceilometer**—Cloud height measurement should take only 24 seconds instead of the current six minutes with a new ceilometer described by engineers of the U. S. Weather Bureau. Working by triangulation and consisting of a projector, photo-cell detector, and an indicator, the new device is reported to give reliable measurements up to cloud heights of 2,000 ft., either day or night.

▶ **Transistor Circuits**—Now that the transistor has advanced to the stage where circuit engineers can put it to use, they need parameters which describe the circuit behavior of the transistor.

Members of the transistor symposium described several four-pole network equivalent circuits based on using the transistor with a grounded emitter, grounded collector, or grounded base.

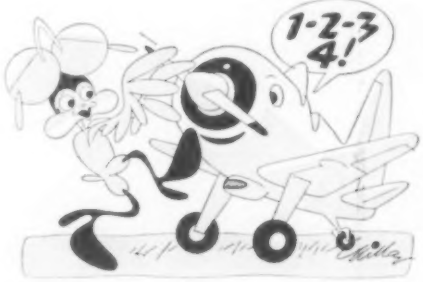
Avast there, mates! All at sea about the change from mph to *knots* in weather reports? For quick calculations, this easy rule-of-thumb will give you a close-enough answer: Take speed in knots, add 15%, and you've got mph.

Is "hot-headedness" costing you money? "Flutter" refers, Boys and Girls, to abnormal high cylinder-head temperature. When that needle goes up, you may be getting *detonation*—and serious engine damage. What should you do about it?

Well, if you are taxiing—reduce power immediately. Be sure that your cowl flaps are open. Avoid prolonged engine run-up.

If you are in the air, reduce throttle settings and adjust for a richer mixture if your plane has a mixture control. If you do not have a mixture control, land as soon as possible for a carburetor adjustment. Open cowl flaps. If your plane has a variable-pitch prop, increase RPM.

Best friend a radial engine ever had—whether it's in frequent operation, or dead storage



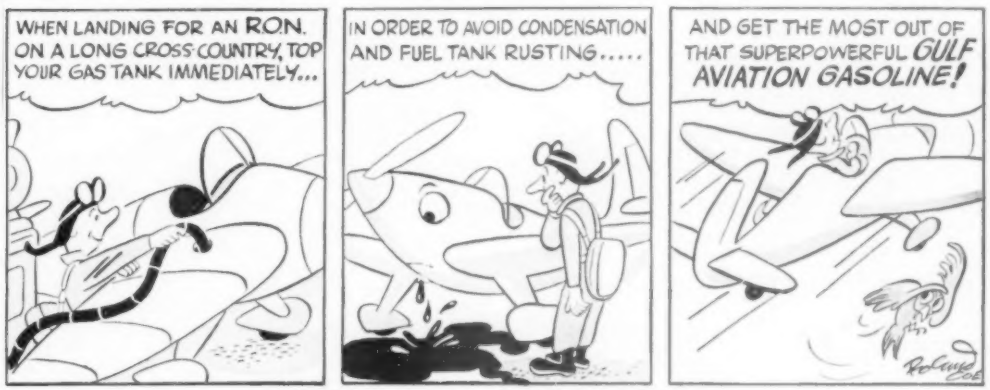
For frequent operation: treat it to Gulf Aircraft Engine Oil, Series R—the very finest non-detergent, straight mineral oil for radial engines (or for any engine when operating conditions do not require a detergent oil). It's approved by Pratt & Whitney and other manufacturers for all types of service.

For dead storage (or infrequent use): keep filled with you-know-what (see paragraph above). And then remember to pull the prop through at least four turns every three days.

P.S.: In horizontally opposed and Ranger in-line engines, use Gulfpride Aviation Oil, Series-D.

FREE! A "must" for active pilots. That's the *Gulf Airside Airport Directory*. Ask your Gulf Airport dealer for a copy.

GULF
AVIATION PRODUCTS


WHEN LANDING FOR AN R.O.N. ON A LONG CROSS COUNTRY, TOP YOUR GAS TANK IMMEDIATELY...
IN ORDER TO AVOID CONDENSATION AND FUEL TANK RUSTING.....
AND GET THE MOST OUT OF THAT SUPERPOWERFUL GULF AVIATION GASOLINE!

Gulf Oil Corporation . . . Gulf Refining Company

They also described a means of measuring the equivalent circuit impedances.

The choice of equivalent circuits and descriptive parameters should be made according to the particular application of the transistor, the IRE audience was told by Dr. J. A. Morton of the Bell Laboratories.

Three papers were presented describing the application of transistors to band-pass amplifiers, oscillators, and pulse circuits. R. P. Moore of RCA described the use of capacitance or inductance in transistor circuits to compensate for, or to increase the natural tendency of transistor gain to fall off with increased frequency.

J. S. Schaffner of General Electric said that the transistor is well adapted to use in oscillator circuits except at high frequencies where the relatively long transit time of the "holes" (positive electrical charges) is a limiting item. Schaffner compared the operation of a transistor to that of a klystron tube when both are used as an oscillator because the transit time of transistor "holes" is dependent upon collector (plate) voltage.

J. H. Felker of Bell Labs stated that a single transistor may be used to replace two vacuum tubes for many types of pulse circuits. He described the use of the transistor as an "astable" (free-running) pulse generator which can generate a 4 microsecond pulse with a rise time of only 0.02 microseconds.

Unit Checks on Propeller Strains

A new method to increase the sensitivity of strain gages has been developed for study of propeller stresses in flight. The new technique was worked out by the Armour Research Foundation of the Illinois Institute of Technology, in a program sponsored by USAF. The technique involves applying excitation voltage as a series of pulses instead of using continuous excitation. This permits the use of higher gage voltages.

Transducer List Is Instrumentation Aid

Airframe, engine, and accessory manufacturers will find it much easier to solve their test instrumentation problems as a result of a new publication, "A Compilation of Analog Transducers," prepared by the Allen B. DuMont Laboratories. The booklet is loaded with practical information useable throughout the aviation industry. Nor is it merely a catalog—DuMont doesn't make any of the more than 300 transducers listed.

Rapid advances in airframe and engine art have forced manufacturers to go to greatly increased instrumentation of their experimental and prototype airframes and engines. Design engineers need a myriad of performance data to strain the last ounce of performance out of the design and to point the way to new and improved designs.

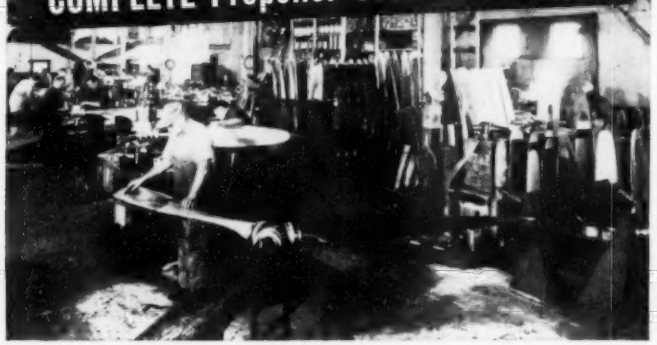
Such phenomena as strain, acceleration, displacement, pressure, temperature and others can usually be measured most easily, and certainly be recorded most easily, if first converted to electrical signals. That is the function of the analog transducer—the broad generic name applied to such devices as synchros, strain gages, thermocouples and others. But choosing the proper transducer is usually a difficult problem.

The complexity of the instrumentation engineer's task is forcefully illustrated by the fact that the new DuMont compilation lists transducers to measure more than 60 different phenomena.

And for a particular application, angular position for instance, 40 different transducers are listed. But imagine the difficulty of selecting the best transducer without such a listing.

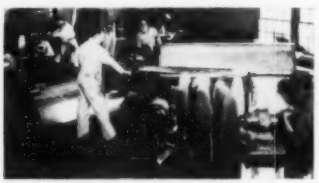
DuMont recognized the need for the compilation as a result of its consulta-

COMPLETE Propeller Overhaul & Repair



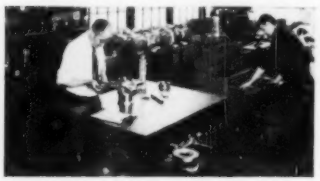
15,000 sq. ft. devoted exclusively to the specialized repair and overhaul of all types of metal propellers.

Complete facilities for the repair and modification of all types of governors.



Fully equipped with modern machinery including hydraulic press and twisters.

All balancing performed in separate balancing room.



Rigid process and final inspection of every component part.

APPROVED REPAIR STATION No. 3503. Write or call for further information.

THE Propeller Service Corporation

BRADLEY FIELD • WINDSOR LOCKS • CONN.

FIGHTER

or FREIGHTER

WEDJIT

AIRLOC

WIRE HARNESS BAND

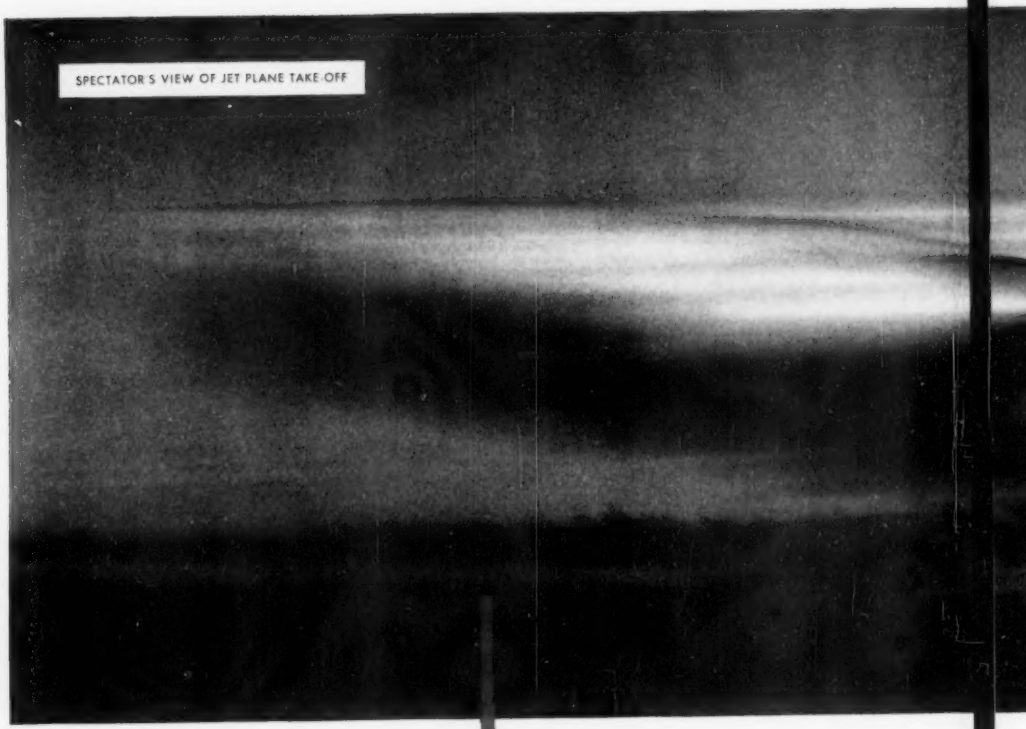
SOL-A-NUT

Prop-driven or jet . . .
they all use special fasteners by

MONADNOCK MILLS San Leandro California

subsidiary of UNITED-CARR FASTENER CORP.

Monadnock, with a wealth of fastening experience, also has reliable development and production facilities available to manufacturers of quality products.



TOO FAST TO FOLLOW

• Socony-Vacuum research engineer studies glass burner simulating combustion in jet engine. Small-scale burners take the place of full-size jet burners —enable researchers to make quick tests under operating conditions. These tests are part of the jet fuel research program Socony-Vacuum is carrying on for the Air Force.

PACING AIR PROGRES S

...SO

Socony-Vacuum "flies" at 60,000 feet—makes steep climbs, sets distance records in its test-tube jets. The purpose: to find a jet fuel that eliminates flame-outs and foaming—lengthens flight range.

JET PLANES—operating at supersonic speeds—in temperatures ranging from 100 above to 70 below—pose many fuel problems. Sometimes fuel boils away in fast climbs...flame-outs call for restarting at high altitudes. Carbon deposits may interfere with engine operation.

Socony-Vacuum is helping solve these fuel problems by duplicating flight conditions in the laboratory...measuring *flame speeds* of experimental fuels...swapping information with manufacturers and designers—so that the military planes of today and the commercial jets of the future may go farther, faster, on less fuel.

Mobilgas AIRCRAFT

Mobiloil AERO

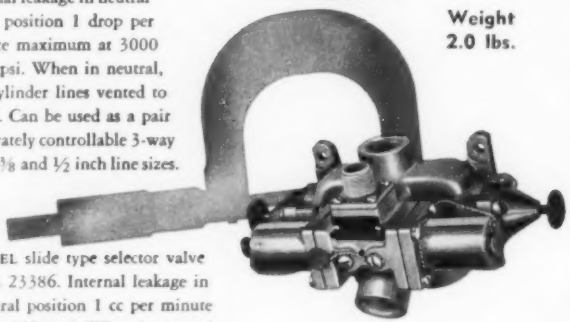
SINCE HISTORY'S FIRST FLIGHT!

SOCONY VACUUM OIL COMPANY, INC., and Affiliates, MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

New ADEL Lightweight
3000 PSI SOLENOID, PILOT-OPERATED 4-WAY SELECTOR VALVES

New ADEL poppet type selector valve No. 21700. Internal leakage in neutral position 1 drop per minute maximum at 3000 psi. When in neutral, cylinder lines vented to return. Can be used as a pair of separately controllable 3-way valves. ⅜ and ½ inch line sizes.

Weight 2.0 lbs.



New ADEL slide type selector valve No. 23386. Internal leakage in neutral position 1 cc per minute at 3000 psi. When in neutral, cylinder lines can be blocked or vented to return. Variations available with centering springs or detents. ¼, ⅜ and ½ inch line sizes.

CHARACTERISTICS OF BOTH POPPET AND SLIDE TYPE VALVES:

- ★ No moving seals.
- ★ Integral filter for protection of pilot valve against effect of dirty oil, foreign particles, etc.
- ★ Continuous duty solenoids; either 1 or 2.
- ★ 4500 psi. proof pressure on all ports.
- ★ Pressure drop 50 psi. at 6 gpm.; 100 psi. at 9 gpm.
- ★ Produced for 17-30 volts dc, 10 watts minimum; available for other dc voltages.
- ★ Available with or without manual control.

New designs are more compact, have low weight, longer service life, less maintenance, easy installation characteristics plus increased operating efficiency. ADEL'S extensive engineering and manufacturing experience in Aviation Hydraulic Equipment insures uniform excellence of products.

ADEL LEADER IN HYDRAULICS

For complete engineering specifications and counsel, address ADEL DIVISION, GENERAL METALS CORPORATION, 10775 Van Owen St., Burbank, Calif.

DIVISION OF GENERAL METALS CORPORATION • BURBANK, CALIF. • HUNTINGTON, W. VA.

CANADIAN REP.: RAILWAY & POWER ENGINEERING CORPORATION, LIMITED

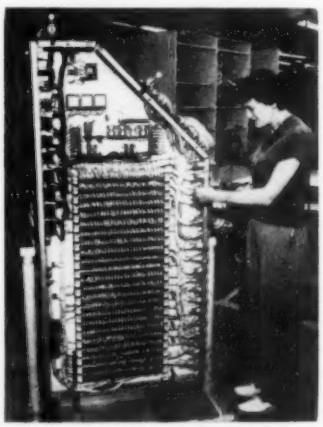
tion activities in oscillographic applications.

► **Complete Characteristics**—The new DuMont publication lists up to 22 characteristics for each transducer. Characteristics listed include: function; principle of operation (magnetic, capacitance, piezo-electric, etc.); accessories required; transfer characteristics (relationship between measured quantity and output signal); power required; amplitude range; sensitivity; output characteristics; bandwidth; resonant frequency; resolution; linearity; weight; range; sturdiness; temperature limitations; mounting; size; remarks; model designation, and the name of manufacturer.

More than 300 transducers are listed. However, DuMont recognizes that the listing may not be all-inclusive, particularly in a fast-growing industry. The company therefore welcomes additional listings.

One section in the brochure gives the characteristics of a variety of available Geiger-Mueller tubes, used in measuring radio activity. Another section lists reference material which describes the use, calibration, and application of various types of transducers.

"A Compilation of Analog Transducers" may be obtained by writing to the Instrument Division, Allen B. DuMont Laboratories, Inc., 1500 Main Ave.; Clifton, N. J. The price is 50 cents per copy.



AVIONICS JUNCTION

This is one of the 1,000-lb. avionic junction boxes installed in Lockheed's new 1049 Super Constellations. Containing 1,500 wires, 600 terminals, plus fuse boxes and sockets, the structure centralizes many electrical functions aboard the aircraft. Interchangeability and rapid, easy removal simplifies maintenance of the aircraft and reduces its time on the ground, says the manufacturer.

Just Published!

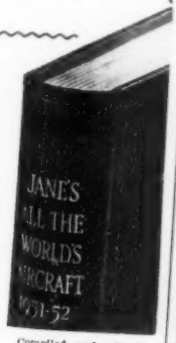
JANE'S 1951-52 Edition

ALL THE WORLD'S AIRCRAFT

Facts and figures on both civil and military aircraft of the world

"Look it up in Janes!"

This phrase has become a symbol for accuracy and authority throughout the aviation world. Each issue is a compilation of data on the aircraft of all nations made possible only by the cooperation of manufacturers, service departments, technical officials, and correspondents stationed all over the globe.



Compiled and edited By Leonard Bridgman
Over 450 pages, 8 x 10
$22.50

MILITARY AVIATION. Fully revised and brought completely up to date, this section of the book presents a record of the air forces of all nations, together with details of their organization, bases, training, equipment, and reproduction of national markings. Includes new data on Russian aircraft.

CIVIL AVIATION. Lists the names and addresses of the aeronautical departments . . . associations . . . transport companies . . . flying clubs . . . charter operators and aviation publications of all countries of the world . . . and international civil aircraft markings.

AEROPLANES. Provides scores of illustrations and 3-view general arrangement drawings. Gives facts and figures on type, wing, fuselage, tail unit, landing gear, power plants, accommodation, armament, equipment, dimensions, weights, loadings and performance for a great variety of aircraft.

AERO-ENGINES. Complete, detailed information on the aero-engines of the world's aircraft: jet propulsion — propeller turbine — gas turbine — piston engines. Gives data on compressor, compressor housing, combustion chambers, exhaust cone, fuel system, etc.

1951-52 edition bigger and better than ever . . .

- Introduces nearly 850 illustrations, 472 of which are new
- Developments in gas turbine engines exhaustively treated
- Gives latest authentic information on Soviet aircraft

SEE THIS BOOK 10 DAYS FREE

McGraw-Hill Book Co., Inc.
330 W. 42 St., NYC 36

Send me JANE'S ALL THE WORLD'S AIRCRAFT, 1951-52 Edition, for 10 days' examination on approval. In 10 days I will remit $22.50 plus few cents for delivery, or return the book postpaid. (We pay for delivery if you remit with this coupon; same return privilege.)

(Print)
Name .....
Address .....
City ..... Zone ..... State .....
Company .....
Position AW-3-24-52

This offer applies to U. S. only.

Clary-Tested

AIRCRAFT HARDWARE

Complete Stocks — Completely Reliable

CLARY-TESTED HARDWARE

Careful testing of aircraft hardware in Clary's own laboratory cuts down rejects on your production line, assures you material that conforms to AN specifications. Much testing is done on machines designed and built by Clary for the purpose, and some of them even supply records of actual test findings for your files. You can fill virtually all aircraft hardware requisitions from Clary's complete stocks, and packaging is to your specifications.

BEARINGS LUBRICATED TO AN SPECIFICATIONS

Aircraft control bearings, rod end bearings and pulleys are lubricated in Clary's own shop to current AN specifications. We also offer bearing and pulley relubrication service to airframe and parts manufacturers.

BONDED STOCKS OF BOLTS, SCREWS AND NUTS

Clary carries all sizes and types.

Clary
MULTIPLIER CORPORATION

For information, write, wire or phone
AIRCRAFT HARDWARE DIVISION
Serving the aircraft industry since 1941

425 E. 54TH STREET, LOS ANGELES, CALIFORNIA • CEntury 2-9221
Cable Address: CLARYMULT

Convair 340 On the Line

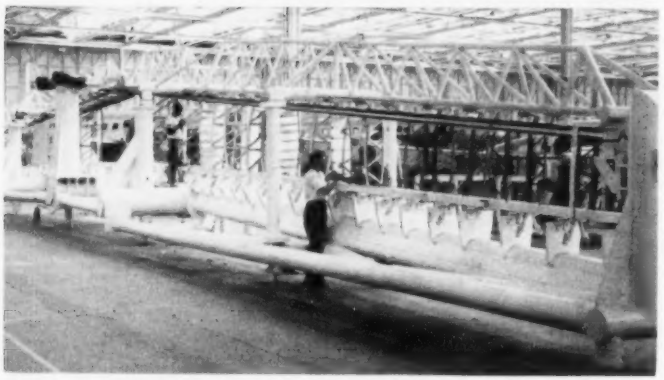
With delivery to United Air Lines this month of its first Convair 340, Consolidated Vultee will start putting a dent in its $90-million backlog for the new 44-seat twin-engine transport. Orders are on the books for more than 140.

While the new Convair-Liner generally follows the lines of the 240, of which 175 were built, the West Coast manufacturer cites a number of improvements. These include:

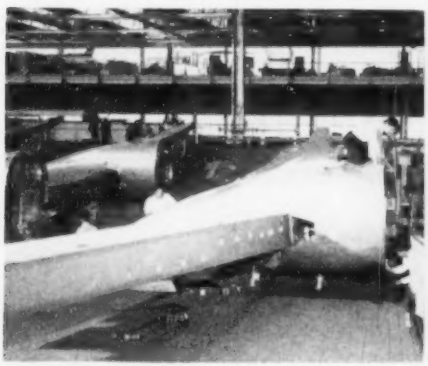
- **Fuel capacity increase** to 1,700 gal. from 1,000 gal.
- **Larger flaps** and new augmentor tubes for greater performance.
- **Single-section wing** instead of the three-section wing used on the 240. This will save weight.
- **High activity props** (Ham Standard) with diameter increased 6 in.
- **New ventilation system** for flight deck.
- **Refrigeration system** which can be operated while plane is on the ground.
- **Electrical system** designed for easier maintenance.

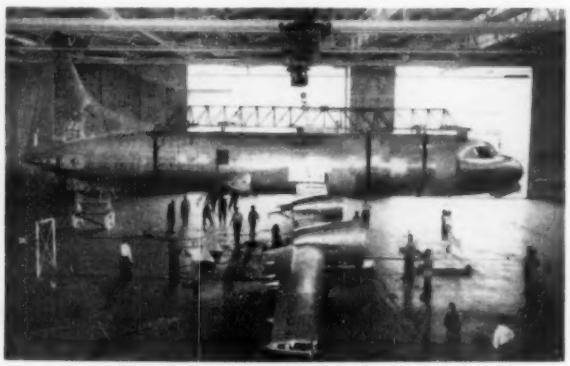
Power will be supplied by two P&WA R-2800CB-16 engines delivering 2,400 hp. each.

Among the carriers awaiting the new transport are United (40), Chicago & Southern (two more just ordered, for a total of ten), Braniff, Continental, Mid-Continent, Delta, National, Northeast, KLM-Garuda Indonesian Airways, Philippine, Hawaiian, and Aero A. Y. (Finnish). A number have been ordered for executive use.

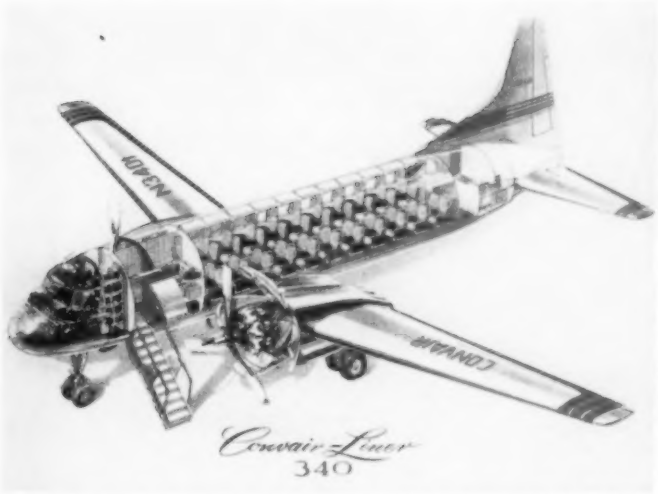


HUGE FIXTURE is used for assembling the Convair 340 wing in one piece to save weight. Old 240 wing was made in three sections. This 113-ft. fixture is the largest ever built by Convair for complete wings.

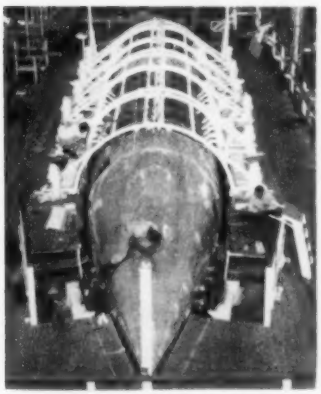




MATING TIME for the 340's one-piece wing comes at this station of the San Diego plant, after the fuselage has been lowered into place by overhead crane.



44 SEATS for passengers in 11 rows are provided in the new plane. Racks for carried-on baggage are provided just forward of the cabin.



FUSELAGE center section begins to take shape in this fixture. Other fuselage sections involved in production are nose and tail.

SPAGHETTI spread on long board is wiring for 340s new electrical system designed for easier maintenance.

NEW FLAPS and augmentor tubes will increase performance of the 340. Addition of inboard flaps to the 240's outboard flaps gives extra area.

THEY'RE ON THE JOB

For Jet or Reciprocating Engines Airborne or Test Stand Use

Thermo Electric
THERMOCOUPLES

They are on the job for all important temperature measuring applications. All are available in standard calibrations and in many types for most aircraft and engine installations.

To reduce set-up time of Test Stand Thermocouples, this Type 4C21P Turbo-Engine Exhaust Thermocouple is fitted with our Quick Coupling Connection Head.

Thermo Electric
ENGINE HARNESSES

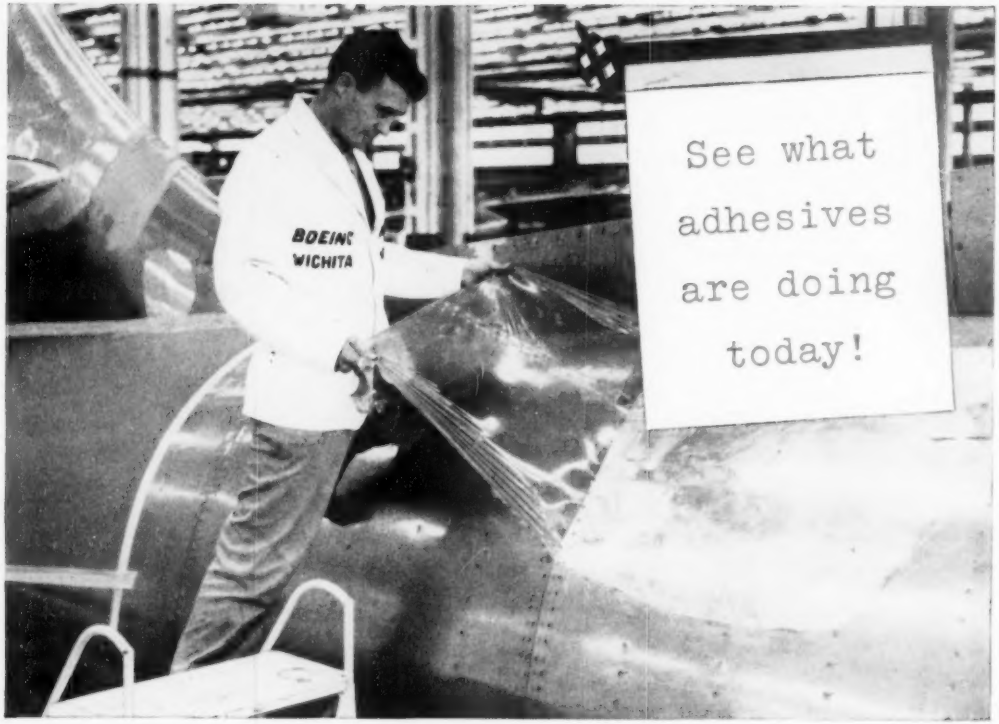
TURBO-ENGINE HARNESS ASSEMBLIES connect multiple thermocouples in parallel to one instrument lead. The equal resistance between any pair of thermocouple connections and main terminals permits checking temperatures of individual thermocouples or the average temperatures of the entire circuit.

RECIPROCATING ENGINE HARNESSES are designed to check the temperature of each cylinder head thermocouple.

All Harnesses are designed and engineered to meet individual engine requirements.

For additional information on our Aircraft Products, Send for Catalog Section 12C.

FAIR LAWN NEW JERSEY
Thermo Electric CO. INC.



"Saving face" for American metal

Did you know that the speed of an airplane can be cut as much as 20 miles per hour by mars and scratches on the metal skin?

Like other aircraft manufacturers, the Boeing Airplane Company was faced with the problem of metal protection. Working with Boeing engineers, 3M developed a *strippable coating* which could be sprayed to sheet stock before it started down the production line. This tough, elastic coating effectively protects polished surfaces during handling and forming operations . . . right down to final inspection. Easily removed, this famous 3M strippable coating has saved Boeing—and other manufacturers—large amounts of time and money by "saving face" of polished metal.

Wherever highly polished metal is used, a 3M strippable coating can save money by reducing rejects, saving repolishing costs and speeding production. These strippable coatings are another example of an *engineered* adhesives application from 3M, one of the country's largest producers of industrial adhesives, coatings and sealers.

See what adhesives can do for you . . .

It will pay you to investigate the metal-saving possibilities of strippable coatings. Call your 3M salesman and let him give you the complete story. And for information on all Adhesives, Coatings and Sealers, write 3M, Dept. 113, 411 Piquette Avenue, Detroit 2.

3M COMPANY

OVER 1,000
ADHESIVES · COATINGS · SEALERS

ADHESIVES AND COATINGS DIVISION • MINNESOTA MINING AND MANUFACTURING COMPANY
411 PIQUETTE AVE., DETROIT 2, MICH.
GENERAL SALES OFFICE: ST. PAUL 6, MINN.
EXPORT OFFICE: 270 PARK AVE., NEW YORK 17, N. Y. • IN CANADA: LONDON, CANADA

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE ADHESIVE TAPES • "SCOTCH" BRAND SOUND RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS

Cessna Builds Military Business

A revealing glimpse into how closely the personal plane industry fits into the U. S. arsenal is afforded by studying Cessna Aircraft Co.'s operations during its recently concluded fiscal year.

During fiscal 1951, the Wichita firm's military sales mushroomed to $18,869,842 from the previous year's $156,167. But along with the "guns," Cessna was still dispensing plenty of "butter"—commercial aircraft sales also were up—though not so sharply—from fiscal 1950's $5,391,125 to $5,432,677 in 1951.

Hydraulics sales, especially in the farm equipment field, climbed to $1,534,070 from $1,028,759, and even though the company discontinued its furniture operations early in fiscal 1951, sales there came to $645,731 compared with the previous period's $582,448.

Cessna not only holds big contracts for Army Field Forces' L-19 Bird Dog liaison planes, but also is a very active airframe subcontractor, producing major assemblies for the Boeing B-47 and Lockheed T-33 and F-94. The company will get into production the latter part of this year on Republic F-84F components for General Motors. At the end of fiscal 1951, military backlog was about $80 million.

The company is actively eyeing the helicopter—early negotiations with Seibel Helicopter Co., Inc., also of Wichita, have been completed (AVIATION WEEK Mar. 3, p. 7). Seibel had developed a military version of its two-place S4, designated YH-24.

Cessna now operates three plants—in Wichita, Hutchinson and Prospect—and has negotiated several certificates of necessity to make possible further expansion.

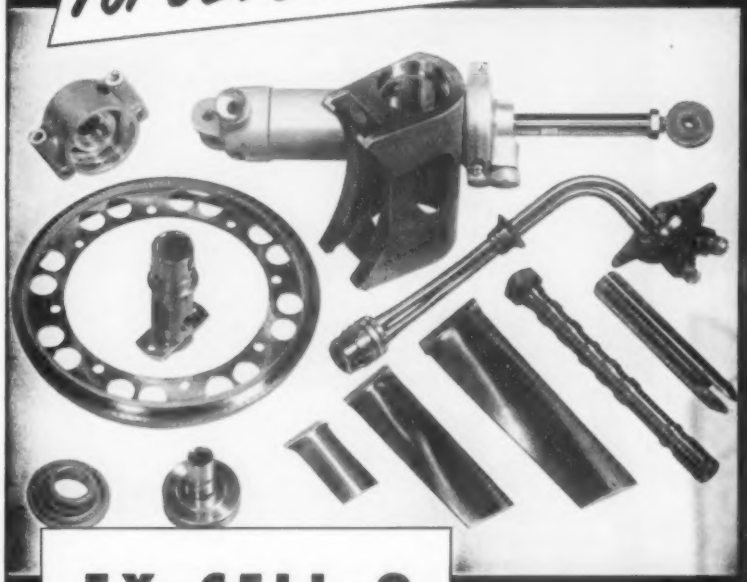
The four-place Model 308 has been turned over to the AFF for evaluation. Commercially, the firm dropped the two-place 140 line to conserve materials for the higher-utility four-seat 170. Civil sales of the 190 were curtailed because a number of these, designated LC-126C, were diverted to the military.

AMC Sets Up New Small Purchase Unit

Dayton—Creation of a "Small Purchase branch" to drain a large workload from regular procurement operations has been announced by Air Materiel Command at Wright-Patterson AFB.

The new segment will be responsible for processing contracts for "off-the-shelf" items with a contract value under $10,000. Methods of procurement will be similar to that of local offices.

For JETS and PROPS...



EX-CELL-O *Precision* PARTS

ABOVE: Typical precision aircraft parts manufactured by Ex-Cell-O. All details of assembled units were manufactured at Ex-Cell-O to customers' specifications.

For more than 20 years Ex-Cell-O has been an important parts supplier to the aircraft industry. Ex-Cell-O precision, a byword in piston-powered aircraft, has continued to play an important role in the development of jet power. Today, leading manufacturers of turbojet engines, reciprocating engines and airframes rely on Ex-Cell-O for precision parts and sub-assemblies requiring unusual accuracy and uniformity of dimensions, finish and hardness.

Since the introduction of jet-powered planes Ex-Cell-O has developed special machine tools for the volume production of compressor parts and fuel system parts and sub-assemblies, including nozzles.

Ex-Cell-O's aircraft parts production facilities are being used now in cooperation with the defense program. If you are working with this program too, perhaps Ex-Cell-O can help you.

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

XLO

EX-CELL-O Air PRECISION

S.S.White METAL MUSCLES® give pilots a "boarding house reach"!

ONE of the important aircraft navigational aids is the radio direction finder. Because of necessity, the main elements of this equipment—control unit, radio receiver and loop are often located as much as 20 feet apart. But distance is no problem for the pilot because of the "boarding house reach" afforded by S.S.White flexible shafts. In a typical application two flexible shafts are connected to the control unit at the pilot's station. One shaft, 20 feet long, tunes the receiver. The other, 13 feet long, connects the pointer of the control unit to the loop.

S.S.White flexible shafts of both the remote control and power drive types are widely used in aircraft. Their adaptability, simplicity and dependability meet all the requirements of this type of duty.

SEND FOR THIS 256-PAGE FLEXIBLE SHAFT HANDBOOK

Complete, authoritative information on flexible shaft construction, selection and application. Copy sent free if you write us *direct* on your business letterhead, giving your title. There's no obligation.

THE S.S.White INDUSTRIAL DIVISION
DENTAL MFG. CO.

Dept. V, 10 East 40th St.
NEW YORK 16, N. Y.

Western District Office • Times Building, Long Beach, California

PRODUCTION BRIEFING

► **American Welding & Mfg. Co.**, Warren, Ohio, has signed an agreement with Warren Machine & Die Co. whereby the latter became a division of American Welding Jan. 1. The transaction gives the parent firm a 5,400-sq. ft. plant and much precision equipment. American Welding also is adding to its own plant to step up production of jet and piston engine parts.

► **American Helicopter Co.** has occupied a new 15,000-sq. ft. plant adjacent to its Manhattan Beach, Calif., facility. New building will house firm's general offices, engineering department and engineering lab.

► **Beech Aircraft Corp.** has concluded a contract to modernize 83 Twin Beech C18S to D18S standard for the RCAF. The project will be handled by McDonald Bros. Aircraft Ltd., Winnipeg, with Beech engineering supervision.

► **General Fireproofing Co.**, Youngstown, Ohio, maker of metal chairs, has received a large contract to build ejection seats for Republic F-84 Thunderjets. GF now makes F-84 tail assemblies, will soon make aft fuselage sections for that airplane, and will also build ailerons and other components for the Boeing B-47. The company has between $20-$30 million in defense orders.

► **Multi-Tron Laboratory**, Chicago, has moved to larger quarters at 4624 W. Washington Blvd. from 5522 W. Harrison St. The firm specializes in electronic research, design and production.

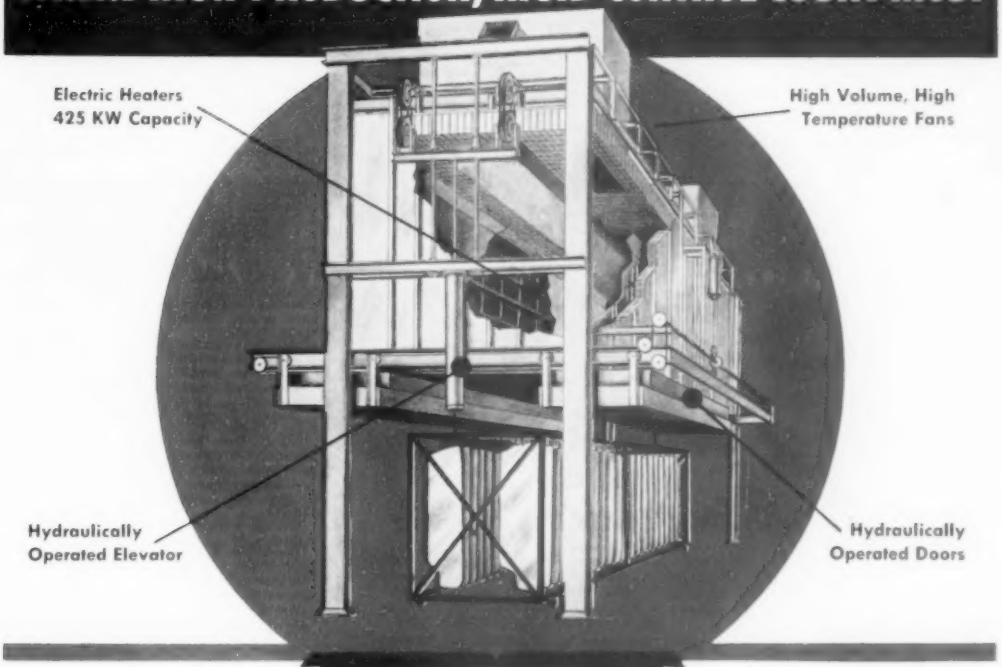
► **Republic Aviation Corp.** has leased a 216,000-sq. ft. plant at Manorhaven (Port Washington), Long Island, N. Y., for manufacturing jet fighter wings and other main components. At capacity, the facility will require 2,000-3,000 employes.

► **Voi-Shan Mfg. Co., Inc.**, makers of bolts, studs and fasteners for aircraft and general use, has completed a 15,000-sq. ft. production addition to its Culver City, Calif., plant.

► **Thompson Products Ltd.**, plans to put up a $4-million factory at St. Catherines, Ont., to build jet engine parts for USAF. The new facility will employ about 600.

► **Chance Vought division** of United Aircraft Corp. has upped its Dallas employment to a record 9,600.

WHERE HIGH PRODUCTION, RIGID CONTROL COUNT MOST



DESPATCH

Bottom Entry *Quick Quench*

ALUMINUM HEAT TREATING FURNACE

Fills the Need Best

A large Eastern Aircraft plant is meeting high production schedules and rigid Government aircraft specifications day after day with this Despatch bottom entry, quick quench furnace on the solution heat treating of aluminum and aluminum alloy shapes.

Operating range of the furnace is from 212° F. to 1250° F. with a uniformity of plus or minus 5° F. Heating equipment is of sufficient capacity to bring a 750 lb. aluminum work load, plus a 1000 lb. steel rack, both at room temperature, to 920° F. in 20 minutes when furnace is loaded at operating temperature.

Hydraulically operated furnace doors and elevator are interlocked and automatically controlled from a push button station. They provide for rapid movement of the load to the quench tank. Speed of quench is considerably less than 10 seconds.

Furnace is heated with 425 KW capacity nichrome, rod type electric heaters mounted along each side wall and protected by suitable radiation shields. Two high volume, high temperature air circulating fans assure rapid transfer of heat to parts being processed.

BE PREPARED FOR GREATER DEFENSE PRODUCTION

For fifty years DESPATCH has pioneered and engineered better, more economical heat treating equipment for leading metal processors throughout the country. Be prepared for greater defense production tomorrow by installing DESPATCH engineered equipment TODAY. Resident engineers located in your vicinity are ready to study your situation and help you with your heat treating problems.

FIFTIETH ANNIVERSARY
DESPATCH OVEN COMPANY

WRITE TO DEPT. W FOR MORE INFORMATION

MINNEAPOLIS OFFICE:
619 S. E. 8th Street

CHICAGO OFFICE:
4554 N. Broadway

Sales Offices in all Principal Cities

AMPHENOL
Carries the Pulse
OF THE
Electronics INDUSTRY
. . . and if the cables and connectors in your equipment aren't of top quality, then the pulse will be weak and unreliable. Insist on Amphenol cables and connectors and be assured of maintained continuity and positive connection.
TEFLON CABLES developed by Amphenol are ideally suited for applications in the high temperature range. These cables operate without difficulty in temperatures from —100°F. to +450°F. They also feature extremely low loss and high voltage break down. Look to Amphenol for the entire series of RG Cables.
AUDIO CONNECTORS made by Amphenol are ruggedly built for severe usage and feature a unique watertight seal that provides full protection against water leakage. This type of connector is now standard on all Signal Corps communication equipment. Contacts are spring loaded and self-cleaning.
A-N CONNECTORS require a strict conformity to Army-Navy Specifications. Many of the now standard design features were originated and developed by Amphenol's extensive engineering staff. Amphenol's A-N Cable Assemblies provide the ideal combination of top quality components and high grade workmanship.
RF CONNECTORS are better if they are made by Amphenol—better because they are made better! Amphenol's RF Connectors have the quality and precision necessary in the most delicate and accurate of instruments, yet are rugged enough to meet the punishing demands of modern military aircraft and mechanized ground equipment.
AMERICAN PHENOLIC CORPORATION
1830 SOUTH 54TH AVENUE • CHICAGO 50, ILLINOIS
AMPHENOL

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

Acme Backing Corp., Meadow & Bogart St., Brooklyn, N. Y., barrier material, $220,000.

Acme Aluminum Alloys, Inc., 232 N. Findlay St., Dayton, components, $99,200.

Aeroquip Corp., 300 S. East Ave., Jackson, Mich., couplings, $81,411.

Allied Products Corp., 22677 Hurt Rd., Detroit, components, exceeds $250,000.

G. Barr & Co., 3691 S. Racine Ave., Chicago, isopropyl alcohol, 186,348 gal., $111,808.

Beech Aircraft Corp., Wichita, maintenance spares, exceeds $250,000; spares, exceeds $250,000.

Bendix Aviation Corp., Bendix Products division, South Bend 20, Ind., wheel assembly, exceeds $250,000.

Blackhawk Foundry and Machine Co., Davenport, Ia., castings, $50,000.

Boeing Airplane Co., Seattle, training units, exceeds $250,000.

Boston Gear Works division, The Murray Company of Texas, Inc., Quincy, Mass., machinery & equipment, exceeds $250,000.

Chicago Pneumatic Tool Co., 570 E. Larned St., Detroit, riveting hammer, $54,512.

Curtiss-Wright Corp., Propeller division, Caldwell, N. J., spares, $148,500.

Delco Products division, General Motors Corp., Dayton, spare parts, $91,998.

DoAll Cincinnati Co., Cincinnati, metal sawing machines, exceeds $250,000.

Douglas Aircraft Co., Inc., Santa Monica, Calif., kits & modernization parts, exceeds $250,000.

Drialre, Inc., 132 S. Main St., South Norwalk, Conn., filters, $94,706.

E. I. du Pont de Nemours & Co., Inc., Photo Products dept., Wilmington, Del., photographic paper, $85,959.

Durham Mfg. Co., P. O. Box 7, Greenhills Cincinnati, tow target release, 20,000 ea., $71,880.

Eastman Kodak Co., 343 State St., Rochester, N. Y., photographic paper, $177,600.

Fairchild Camera & Instrument Corp., Jamaica 1, N. Y., terminal board, $100,497.

General Aniline & Film Corp., Ansco division, Binghamton, N. Y., photographic film, $46,702.

C. H. Gosiger Machinery Co., Dayton, lathes, $29,552.

Harco Industries, Inc., 20 Curtice St., Rochester, N. Y., press, 149 ea., $48,663.

The Heil Co., 3000 W. Montana St., Milwaukee 1, refueling trailer, 375 ea., $86,290.

Ingersoll Products division, Borg-Warner Corp., 1000 W. 120th St., Chicago 43, Ill., fuel tanks, exceeds $250,000.

Jack & Heintz, Inc., Cleveland, starters, 147 ea., $40,695.

Keene S. Jackson, 414 East Glenoaks Blvd., Glendale, Calif., parts and equipment, $75,115.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., forgings, exceeds $250,000.

The E. A. Kinsey Co., 335 W. Fourth St., Cincinnati, shapers, exceeds $250,000.

The Lackner Co., Inc., Lackner Bldg., Cincinnati 14, indicator, 9,448 ea., $200,000.

Landers, Frary & Clark, Center St., New Britain, Conn., vacuum cleaners, 875 ea., $30,706.

Lockheed Aircraft Corp., Burbank, Calif., spares, exceeds $250,000.

Michigan Bolt & Nut Co., Inc., 2667 E. Grand Blvd., Detroit, commercial hardware, $136,060.

Midwestern Magnesium division, Kendallville Foundry, Inc., Kendallville, Ind., castings, $65,000.

Morey Machinery Co. Inc., 4-57 26th Ave., Astoria, N. Y. 2, N. Y., lathes, 11 ea., $163,396.

NASCO, Inc., 5005 Euclid Ave., Cleveland, generator, 950 ea., $97,375.

North American Aviation, Inc., Port Columbus, O., spares, $110,000.

"The Most Liberal Pension Plan In The Industry"

•

"The Fastest Growing Co. In The Industry"

●We, too, believe that PIASECKI is the most rapidly expanding company in the industry . . that our pension plan is the most liberal in the industry. We would like to tell you more about BOTH, in detail. If you are seeking a connection with a company whose product has an acknowledged need in the defense of our country, with an equal appeal for the untapped commercial market when the defense job is completed.

● Scheduled 45 hr. 5 day week; premium pay for overtime, group hospitalization, group insurance, paid vacations & holidays. Clean, modern, well-lighted buildings in park-like surroundings only half-hour by car or train from center of Philadelphia. Railroad depot at plant entrance. Work and learn with a leader, with the BEST engineers in the industry.

● WE NEED

TOOL DESIGNERS

— also —

ENGINEERING DRAFTSMEN

. . with aircraft experience on Airframes, Controls, Electrical Installation & Power Plant Installation.

● AND

ENGINEERS

. . for Flight Test, Instrumentation, Structural Test, Materials and Process.

● WRITE

. . giving detailed resume of experience and education to—

Engineering Personnel Manager

Piasecki Helicopter Corp.

Morton, Pa., Near Philadelphia

PRE-MOLDED

seal caps

for sealing INTEGRAL FUEL TANK nuts, bolt heads & Hi-Shear Rivets!

SEAL CAPS ARE ADAPTABLE TO BOTH COMMERCIAL AND MILITARY AIRPLANES

Pre-molded SEAL CAPS present a completely new picture for both the sealing and repair of integral fuel tanks. In addition, SEAL CAPS can be used to seal pressurized cabins and to seal and provide anti-chafing protection over heads of fasteners in fuel cell compartments. Their development supersedes the conventional method of "building up" via a series of time-consuming applications.

SEAL CAPS also (1) lessen weight addition by eliminating "flow-out," (2) produce a tighter tank by reducing workman error and (3) eliminate sealant waste.

SEAL CAPS greatly reduce time when resealing is required and are an important factor in both commercial and military maintenance programs.

NOW IN USE ON CONVAIR'S B-36

Seal Caps have already been proved by actual use on Convair's B-36, where all integral fuel tank nuts, bolt heads and Hi-Shear rivets require protection. Convair engineers report that SEAL CAPS reduce application time, improve weight control, and provide more efficient sealing of fuel tank details.

A detailed application and engineering folder, No. SC-1003, will be sent on request.

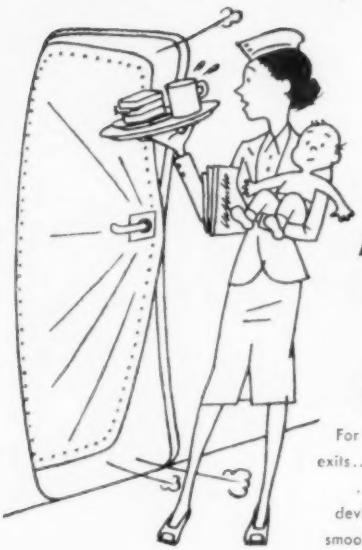
PRE•CAST, INC.

5426 San Fernando Rd., Glendale 3, California

A Division of Products Research Co.

OTHER PRC INTEGRAL WING TANK SEALANTS

Never mind, Minnie, it'll hold...



ADAMS-RITE PRESSURIZED LOCKS ALWAYS HOLD

For door bolting systems...emergency exits...exterior doors...bulkhead doors ...Adams-Rite locks and closing devices provide positive security and smooth, easy operation. Adams-Rite is headquarters for locks. Tell us your problem — our engineers can supply the answer.

Engineering Data Available

ADAMS-RITE MANUFACTURING CO.

540 WEST CHEVY CHASE DRIVE, GLENDALE 4, CALIFORNIA, U. S. A.

WICHITA-ST. LOUIS AREA — GEORGE E. HARRIS, MUNICIPAL AIRPORT, WICHITA, KANSAS

marquardt

ENGINE MANUFACTURING

OPPORTUNITIES FOR...

- aircraft structures design engineers
- fuel controls design and development engineers
- test facility design engineers
- combustion development engineers

MARQUARDT AIRCRAFT COMPANY

7801 HAYVENHURST AVENUE, VAN NUYS, CALIF.

Wanted ENGINEERS AND SCIENTISTS

Unusual opportunities for outstanding and experienced men

These top positions involve preliminary and production design in advanced military aircraft and special weapons, including guided missiles.

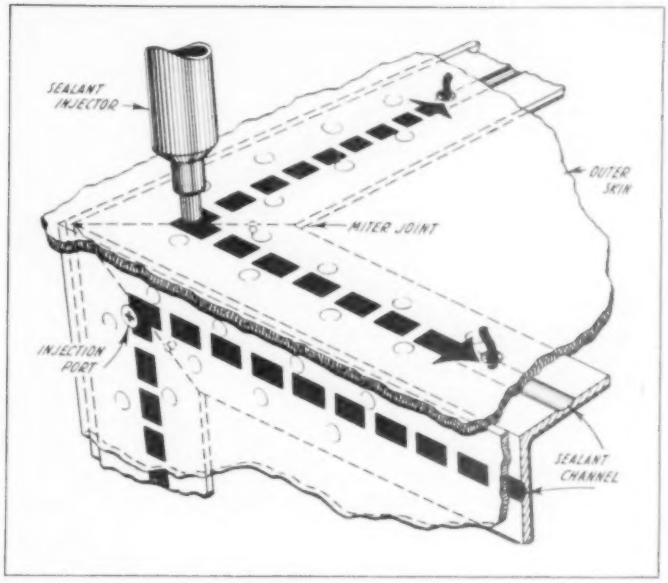
Immediate positions include:

Weight-control engineers
Electronic project engineers
Electronic instrumentation engineers
Radar engineers
Flight test engineers
Stress engineers
Aero- and thermodynamicists
Servo-mechanists
Power plant installation designers
Structural designers
Electro-mechanical designers
Electrical installation designers

Excellent location in Southern California. Generous allowance for travel expenses.

Write today for complete information on these essential, long-time positions. Please include resume of your experience and training. Address inquiry to Director of Engineering.

NORTHROP AIRCRAFT, INC.
1003 E. Broadway
Hawthorne (Los Angeles County) California



How New Fuel Tank Sealer Works

Rohr system requires network of channels in butting metal surfaces; sealant injected through skin ports.

By George L. Christian

A new approach to the problem of aircraft fuel tank sealing has recently been perfected in the laboratories of Rohr Aircraft Corp., under the direction of Bernard Gross. The importance of sealing is indicated by today's huge aircraft fuel capacities, which may reach 25,000 gal. (75 tons) on some current bombers.

And, in addition, the new method, called Chan-O-Seal, can be used to seal pressurized cabins, high altitude avionic gear, and water-tight hulls; in fact, almost any structure requiring hermetic seaming.

▶ **How it Seals**—Method depends on a new design configuration which "provides a continuous network of sealant for skin joints." This is done by incorporating a channel in one of the two butting metal surfaces. Sealant, forced into the channel through injection ports, renders the joint air-tight. Channels run parallel to seams.

Advantages cited for Chan-O-Seal are:

• **Metal-to-metal** contact provides positive bearing and structural rigidity.

• **Injection ports** on the exterior of the airplane greatly simplify maintenance by eliminating tedious and expensive tank draining, removal of equipment, dismantling of upholstery and similar work usually associated with repairing tank or cabin leakage.

• **Minimum sealant** cross section keeps down weight. The fact that no sealant is in the fuel tank means that it does not reduce the tank's capacity. Rohr adds that the small cross section results in the sealant retaining maximum flexibility at low temperatures.

• **Source of leak**, if one occurs, is easily traced.

• **Channels may be built** into extrusions at time of manufacture without additional cost. They may also be formed into sheet metal parts without difficulty.

▶ **Companion Piece**—Individual companion pieces to Chan-O-Seal are bolt and rivet seals, called Lock-O-Seal. These sealing devices consist of a metal retainer and a doughnut-shaped, resilient rubber seal ring. When compressed, metal retainer controls the seal ring and squeezes it into a rectangular instead of circular cross section, effectively sealing the hole through which the bolt or rivet passes.

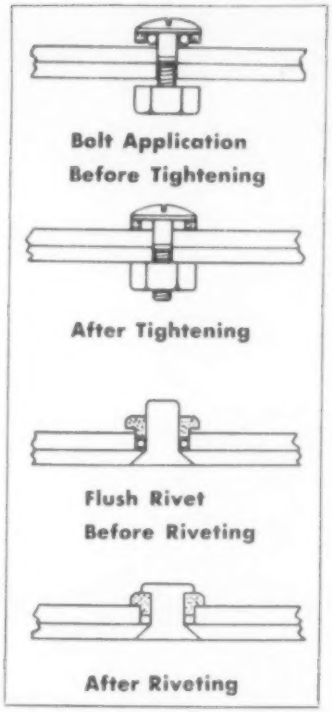
Rohr says it has service reports for the first ten million Lock-O-Seals for bolts alone.

Advantages listed for Lock-O-Seal type seals are:

• **Metal-to-metal contact** gives high strength and rigidity.

• **Thin as well as thick skin** may be fastened using Lock-O-Seal.

• **Self-centering**, free-floating features



COMPANION to sealant system is Lock-O-Seal which hermetically seals bolts, rivets.

ACCESS door design for Lock-O-Seal.

HARTWELL FITTINGS

AN 757

AN 760

AN 759

AN 761

AN 762

AN 758

AN 756

AN 763

Hartwell Aircraft Fittings are manufactured to meet all Air Force and Navy specifications. Our modern equipment and plant facilities are tooled for the precision manufacture of the fittings shown at the left, in a majority of sizes. We are continually tooling for additional AN fittings and sizes. Special fittings can be manufactured to your specifications.

Our large inventory and plant capacity is an assurance of rapid delivery of all types of aircraft fittings from AN 756 through AN 763 and AN brass fittings AN 780 to AN 933

Inquiries and quotations given prompt attention

HARTWELL
AVIATION SUPPLY COMPANY

9035 Venice Boulevard, Los Angeles 34, Calif.
Branch Office: Witchita, Kansas

Manufacturers of:
HARTWELL Flush Latches and Hinges
HARTWELL Cable Terminals

plus ease of replacement simplify use and maintenance of the devices, the manufacturer states.

• **Precision machining** of parts to be sealed is not required when Lock-O-Seal is used.

Chan-O-Seal utilizes Lock-O-Seals for rivets and bolts to fasten outer skin panels to channel sections.

Lock-O-Seal for bolts, first of the Rohr "O-Seal" line, were used with success on Naval aircraft during World War II and have since been extensively applied to civilian as well as military planes, according to the Chula Vista, Calif., manufacturer. Recent applications are for plumbing fittings and access door assemblies.

Walkie-Talkies Handy in Britain

"Walkie-Talkie" radios are being used at Britain's two largest airports, London and Northolt, to speed up maintenance, marshaling and loading of widely dispersed aircraft.

Distances at London Airport between control centers and far-flung craft on the field can be as much as 3½ mi. The small portable sets eliminate a lot of lost motion, enabling maintenance men to continue work at the plane, yet maintain constant touch with the ground engineer and inspectors at control points.

Most extensive use of the self-contained, 15-lb. radios reportedly is at Northolt where British European Airways engineers have put them to good use in calling up for spare parts, notifying traffic control the plane is ready for passengers and guiding aircraft to desired locations. The sets, made by Marconi's Wireless Telegraph Co., Ltd., also are being supplied to overseas bases.

Similar equipment made by an American manufacturer is used for the same purpose by Capital Airlines at Washington National Airport.

Lycoming Builds Mobile Power Set

A self-propelled, air-cooled, 30-kva. generator set, planted on a standard military Willys Jeep, was recently demonstrated to the armed forces by its developer, Lycoming-Spencer division of Avco Manufacturing Corp., Williamsport, Pa.

The Jeep and generators are powered by the same aircooled Lycoming O-290-G5 engine. The powerplant's horsepower was jacked from 95 to 120 to insure adequate electrical output at altitude and during hot weather. Generators are driven through speed increasers. The Jeep is designated Model J-22B1.

"A single J-22B1 generator set develops sufficient electrical output to start all jet fighter airplanes; and two J-22B1s (or one J-22B1 and one Lycom-

LIGHTWEIGHT BAGGAGE TRAILER

The Flexi-Truck, a new lightweight baggage trailer, is being marketed by the Tobey Mfg. Co., 1221 El Segundo Blvd., El Segundo, Calif. The Model 130, developed in cooperation with Western Air Lines, is 4 ft. wide and 8 ft. long. Weight is 450 lb. Lightweight aluminum gates swing upward to make cargo easily accessible. Aluminum deck has ample provisions for drainage. Capable of being towed at 25-30 mph., the Neoprene-tired casters are said to be shimmy- and spin-proof.

TEMCO means

Aircraft Engineering

Aircraft engineering has been an accelerating force in TEMCO's rapid rise to the first echelon of the aircraft industry.

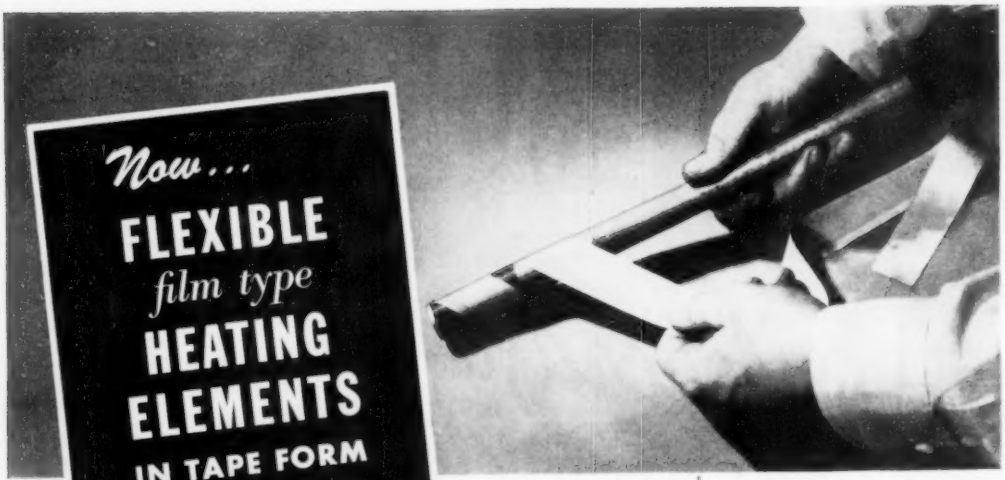
It has taken skilled and experienced aircraft engineering to make possible the versatile achievements of this six-year-old company . . . volumes and varieties of major modification work such as the TF-51 Mustang two-place trainer conversion and the C-54M Flying Hospital development . . . new aircraft design with an eye to economy such as the YT-35 TEMCO Buckaroo military trainer . . . and now completely new military aircraft design of unique concept.

The "E" in TEMCO still is growing . . . It's a capital letter now.

TEMCO
TEXAS ENGINEERING AND MANUFACTURING CO. INC.
DALLAS TEXAS

Texas Engineering and Manufacturing Co., Inc.

DALLAS, TEXAS



Now...

FLEXIBLE *film type* HEATING ELEMENTS IN TAPE FORM

300° F.

Electro-Flex

For Cylindrical Heating Applications
For Temperatures up to 300° F.

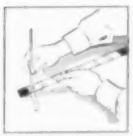
Electro-Flex...the answer to heating problems for *all* cylindrical parts...glass or metal. For Hydraulic lines, relief tubes, pipes, cylindrical valves, etc.... yes, if it's cylindrical and needs heat up to 300° F., then it needs Electro-Flex. Electro-Flex is an electrically resistant plastic material as flexible as cloth, that provides highly uniform heat transfer... (Weighs less than ½ oz. per lineal ft.)...Excellent vibration resistance.

APPLICATION PROCEDURE FOR FLEXIBLE TAPE

1. Moisten glossy side of insulating base pads with Toluol or Xylol. When tacky, place around pipe where buss is to be wrapped, pressing out bubbles. Maintain pressure long enough to insure adhesion.

2. Wrap conductive tape around pipe in helix angle to desired length—(Do not overlap tape). Hold ends of conductive tape in place with small piece of scotch tape until buss has been applied.

3. Coat one end of wire mesh buss with rosin core solder. Draw buss snugly around pipe, covering full width of conductive tape, then solder in place with soldering iron. (Solder on base pad, not conductive tape).



4. Apply well mixed T-I material, covering buss and extending evenly about ⅛" onto conductive tape.

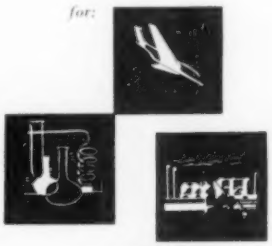
5. Moisten glossy ends of top insulation tape with Toluol or Xylol to activate adhesive and wrap over conductive tape, covering completely. Press out air pockets to insure adhesion. Solder leads to free ends of buss.

6. Electro-Flex kits include: 1. Flexible Tape Element; 2. Bussing Pads; 3. Insulating Tape; 4. Copper Busses and; 5. Tailoring Compound.

SPECIFICATIONS

Description	Volts	Max. Temp.	Ohms/Sq.	Watts Sq. In.	Length of Tape	Width of Tape	Price Complete
E-115-120	115	300° F.	0.368	2.5	10'	1¼"	$9.85
E-27-120	27	300° F.	0.02	2.5	10'	1¼"	9.85
E-27-28	27	300° F.	0.368	2.5	28"	1¼"	4.85

for:



Electrofilm CORP. HEAT-LUBRICATION

7116 LAUREL CANYON BOULEVARD • NORTH HOLLYWOOD, CALIFORNIA

ing-made C-22 trailer) can be used in parallel to start the engines in the largest bombers such as the B-47, under altitude and hot weather conditions," the company says. The Jeep has ample power to tow aircraft when required.

Advantage of the self-propelled vehicle over previously used power supply trailers is its high degree of utility, mobility and maneuverability, especially over rough terrain.

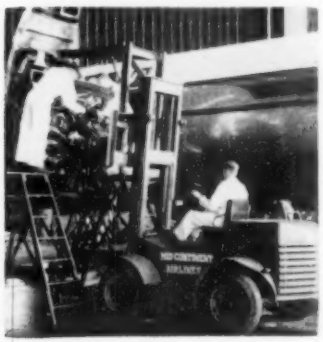
Bendix Buys B-25 To Test Its Products

A guinea-pig B-25 has been purchased by Bendix Products division, Bendix Aviation Corp. of South Bend, Ind.

The bomber, lightened by the removal of all armament, will be used to field-test wheels, brakes, shock struts, steering mechanisms and other units manufactured by Bendix Products.

Laboratory equipment installed aboard the aircraft will enable engineers to record more than16 different functions simultaneously at any desired instant, according to F. C. Albright, manager of aircraft landing gear engineering. Among these functions are wheel speed, brake torque and drag load.

Bendix engineer Gordon Powell, a former F-47 pilot, heads up all test programs connected with use of the plane.



OVERHAUL TIMESAVER

Mid-Continent Airlines reports it has speeded engine changes by using a fork lift truck instead of an overhead hoist. According to the airline, the truck saves time, space and manhours, since the plane doesn't have to be repositioned under a hoist each time an engine lift is needed, and is compact and maneuverable for operation in relatively congested areas of an aircraft maintenance shop. Designed specifically for aircraft work, the truck is a Ross Model 6-P hydraulically operated fork lift of 6,000-lb. capacity.

TWA
Enjoy luxurious, world-proved Constellation service direct to
LONDON
PARIS • ROME
by TWA
. . . the only one-airline service between 60 U. S. cities and leading centers of Europe, Africa and Asia
COMING MAY 1*: New TWA Sky Tourist Constellations to Europe . . . at the lowest year-round fares!
See your travel agent or call Trans World Airlines
*Subject to Govt. Approval
Across the U.S. and overseas . . . you can depend on TWA

What's doing at JACK & HEINTZ...

Successful Vaporization-Cooled Alternator Developed

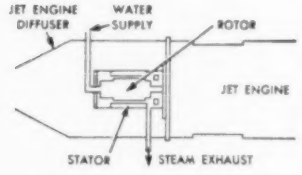
New J&H G75 Alternator is isolated from environment.

Maintains safe operating temperatures at extreme ambient conditions.

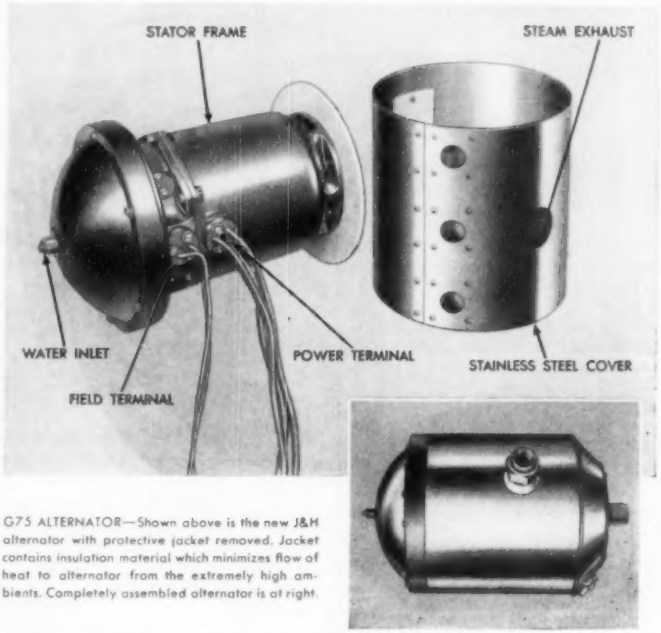
Conventional air-blast and fan-cooled generators or alternators have well-known limitations at high speeds and altitudes. At high altitude, for instance, the quantity of air that can be put through these machines is considerably reduced. In addition, high-speed flight causes a rise in cooling air-inlet temperature, which in extreme cases may eliminate the possibility of using conventional blast systems.

Jack & Heintz engineers, with this in mind, have been working for some time on the development of power units offering environment-free operation which, at the same time, imposes a minimum over-all penalty on the airplane.

Several units of this kind have been developed by J&H. One of these — the G75 Alternator, utilizes liquid vaporization cooling action. It is the first successful environment-free, water-vaporization-cooled alternator in the industry. Due to an efficiency of about 93 per cent, only 3½ lb/hr of water are required at rated load. Operation is limited to a cycle, dependent on the capacity of accompanying coolant reservoir.



VAPORIZATION-COOLED ALTERNATOR JET ENGINE INSTALLATION



G75 ALTERNATOR—Shown above is the new J&H alternator with protective jacket removed. Jacket contains insulation material which minimizes flow of heat to alternator from the extremely high ambients. Completely assembled alternator is at right.

In operation, coolant from the reservoir is injected into the alternator's hollow shaft under pressure. As the coolant is distributed throughout the machine by centrifugal force imparted from rotating members, the latent heat of vaporization extracts machine heat losses. Resultant steam is permitted to escape through an exhaust port. Water inlet flow is regulated automatically by a special J&H valve which is controlled by a temperature-sensing element in the alternator.

Conventional alternators, inherently non-isolated from adverse ambient conditions, must be correspondingly derated for the 35,000 to 60,000 feet, and above, altitude range. The G75, a 3-phase, 400-cycle, 12,000 rpm unit, rated at 12 kva, can deliver 16 kva and maintain satisfactory cooling while operating in extreme conditions of temperature and altitude.

Field power for the machine is taken from the output leads through slip rings and brushes, passed through the rectifier bank and magnetic amplifier of the specially designed GR75 Exciter-Voltage Regulator, and then to the field.

Brush wear problems are minimized in the alternator since the steam atmosphere acts as a lubricant between the brushes and slip rings, prolonging brush life.

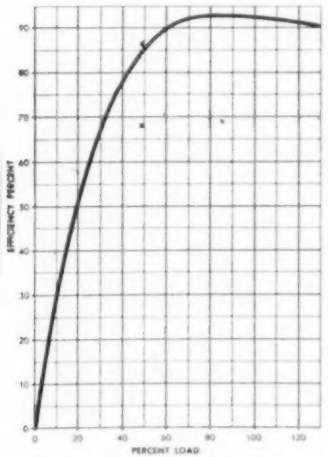
The G75 Alternator is rated at a power factor of 80 per cent, weighs 39 lbs., is 12⅝ in. long and 9 in. in diameter. It is an engine-mounted unit with a 6 in. flange diameter and a 5 in. bolt circle diameter, adaptable to an AND 20002 mounting pad.

...environment-free alternator

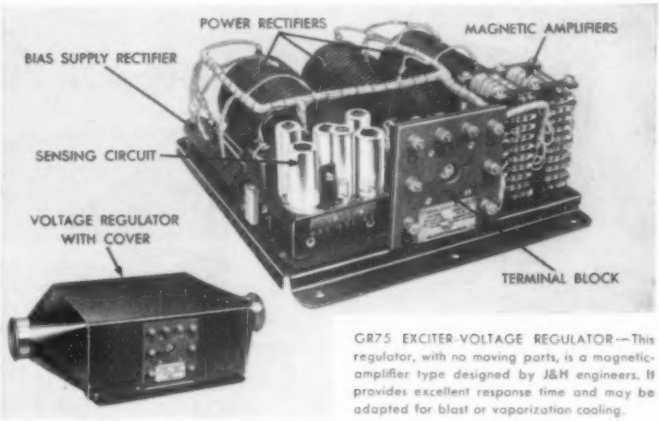
NEW ALTERNATOR OFFERS ADVANTAGES TO JET AIRCRAFT AND GUIDED MISSILE DESIGNERS

Advantages of the G75 Alternator system are:

1. Flow of heat to the alternator is minimized by insulating the stator from the outside shell of the alternator.
2. Heat transfer coefficients for boiling water are 20 to 200 times that for air.
3. High heats of vaporization tend to keep weight of coolant required at reasonably low value (3.4 lb/hr/kw of losses).
4. For short duration or expendable flights, no control is required beyond a simple orifice set to meet full load cooling requirements. Weight of additional coolant used would, in most cases, be less than the weight of a more accurate control.
5. In certain installations, water could be kept from freezing by storing in a separate container such as the oil reservoir, or low freezing-point evaporants may be used.



Graph shows efficiency versus load for the G75 Alternator at unity power factor.



GR75 EXCITER-VOLTAGE REGULATOR—This regulator, with no moving parts, is a magnetic-amplifier type designed by J&H engineers. It provides excellent response time and may be adapted for blast or vaporization cooling.

Chief Engineer's Corner

While we feel that the development of the vaporization-cooled alternator is a definite step toward a solution to the problem of cooling generators on high-speed, high-altitude airplanes, we also recognize that vaporization cooling is not a panacea. Each installation requires careful study to determine the best methods of cooling.

Our engineers have completed the development of two additional types of machines. One of these is a high-efficiency air-cooled, d-c machine in which various new, high-temperature materials have been applied to raise the allowable operating temperature.

The second, also a d-c machine, has been designed for liquid cooling. In this unit, the coolant is passed through the armature and brush holders, and around the field windings.

Since high-speed, high-altitude aircraft are not required to remain aloft as long as in the past, flight duration is a major consideration in determining the best method of cooling electrical equipment. In certain applications, over-all system weight and size may be less if equipment is designed to store its generated heat rather than to dissipate it.

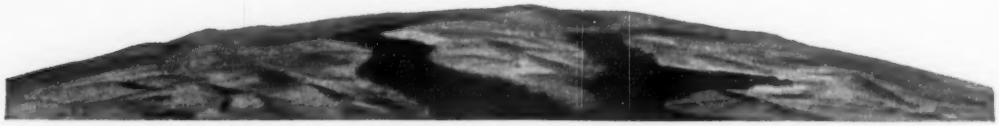
The experience we have gained in the development of these machines during the past few years has proved invaluable to us.

The benefits of this experience are available to your engineers. Write for J&H Technical Bulletin No. 1200, Jack & Heintz, Inc., Dept. 305, Cleveland 1, Ohio.

JACK & HEINTZ
Rotomotive
EQUIPMENT

means electrical, hydraulic or mechanical devices designed to solve unusual problems of developing power, controlling it, or using it.

TAKING MORE WEIGHT OFF THE "HORSES"



through

MAGNESIUM

How high, how fast and how far today's airplane flies depends on its "horses"—*and its weight!* Just increasing horsepower isn't enough . . . lowering the weight-to-horsepower ratio by decreasing the weight of the engine is just as important. The power plant of the modern aircraft contains less weight per horsepower than ever before. Weight has been taken off "horses" with magnesium, the world's lightest structural metal.

One type of turbo jet uses over 40 different magnesium castings, weighing from ¼ pound to over 100 pounds. It was only through the utilization of magnesium that the desired objective of minimum weight structure could be obtained.

In addition to lightness, magnesium is easily fabricated into all common forms . . . castings, forgings, extrusions, sheet and plate. These forms are readily machined, formed or otherwise worked by known methods.

A vital metal in our aircraft today, magnesium offers you tremendous opportunities in improving your product tomorrow. Keep your eye on magnesium if light weight is your aim.

THE DOW CHEMICAL COMPANY

Magnesium Department • Midland, Michigan

New York • Boston • Philadelphia • Atlanta • Cleveland • Detroit • Chicago
St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

NEW AVIATION PRODUCTS

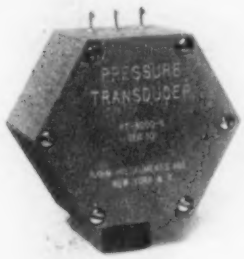
Seat Tank Sprayer

In the 1952 line of Sorenson agricultural spray equipment recently announced by Dakota Aviation Co., national sales agency for the products, is a special spray installation for the Super Cub and Aeronca Champion.

This is the Sorenson Seat Tank Unit. In effect, it is a 53-gal. spray tank that does double duty as a rear passenger seat. Approved by the Civil Aeronautics Administration, the equipment is said to be comfortable, more roomy than the regular seat and can be installed permanently so that the pilot can carry his own flagman or the farmer on inspection tours. It can be used in conjunction with 20-gal. auxiliary tank. A 20-gal. auxiliary tank also can be installed to be used in conjunction with the seat tank.

Other spray equipment being produced by Sorensen this year is a belly tank for the Piper J-3, PA-11 and Super Cub, an 88-gal. inside tank for the four-place Stinson that can be installed with alteration to the aircraft and also, a 100-gal inside tank that can be installed without alteration.

Dakota Aviation Co., Box 18, Huron S. D.



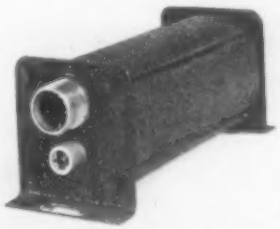
Pressure Transducer

A new line of pressure transducers for a wide range of aircraft and missile applications have been placed on the aviation equipment counter by Rahm Instruments Inc.

The units can be used with various gases and liquids to feed pressure information to telemetering devices, engine gauges, flight instruments, computers and other equipment. Basic configuration is rigid enough for quantity production methods, yet flexible enough to permit maximum latitude in final design details. They are designed to meet "specific problems involving unusual liquid or gaseous media," Rahm says.

Transducers in this line employ a boardon tube. Varying pressures actuate the sensitive element (bourdon tube) which in turn actuates the brush in a precision potentiometer to produce a change in the resistance ratio or voltage. The instruments are suitable for gauge, differential and absolute pressure measurement, 0–15 to 0–4,000 psi. gage or differential; 0–15 to 0–2,000 psi. absolute. Standard cases for the transducers are designed to withstand pressures up to 150 psi.

Rahm Instruments, Inc., 12 West Broadway, New York 7.



Jet Speed Switch

A frequency sensitive electronic switch for controlling jet engine functions, which can be pre-set to actuate a relay at a selected engine speed, has been developed by Manning, Maxwell & Moore.

The device can be used as an intermediary, through which the engine, as it reaches a certain speed, signals to any of its components or related systems for desired action. For example, the switch can be used to cut in the afterburner or change geometry of engine inlet and outlet as dictated by speed. But while primarily for jet engine use, it has broader application as indicated by its loosely defined name, "Type 141SJ Aircraft Speed Switch."

Consisting of a single tube using a Wein bridge type network to sense frequency, the switch offers the advantage of not requiring a separate drive pad, gears or other mechanical connection to

For Dependable
Hose Connections

WITTEK
STAINLESS STEEL
Aviation
HOSE CLAMPS

TYPE WWD (Tangential—with one-piece housing)
TYPE FBSS (Radial—with floating bridge)

Conform to Navy & Air Force Specifications—C.A.A. Approved

WITTEK
Manufacturing Co.
4305-15 West 24th Place, Chicago 23, Illinois

Magnesium

It's the ultimate in metal lightness. So—naturally—it's becoming used *everywhere possible* in aircraft and airborne products.

Magnesium facts—

MAGNESIUM FACTS

worth knowing are yours for the writing (on your letterhead, please). Address

BROOKS and PERKINS Inc.
Pioneer Magnesium fabricators
DETROIT 16, MICHIGAN

Here's the Answer to Low Cost Hole Piercing

DANLY

PORTABLE HYDRAULIC PIERCING UNITS

- Cylinder capacity 12½ tons!
- Built-in hydraulic stripping action
- Compact for portability and flexibility of application

SEND FOR THIS FREE BULLETIN NOW...

See how DANLY Hydraulic Metalworking Equipment Solves your specific problems!

DANLY MACHINE SPECIALTIES, INC.
2140 South Laramie Avenue
Chicago 50, Illinois

*PIONEER PLATE formula 921

*Copyright Applied for 1952

PIONEER
CAST ALUMINUM PLATE and BARS

precision machined for

JIGS, FIXTURES, TABLES, FORM BLOCKS, MASTER TOOLING, DIES, etc.

- Light, easy to handle, high machineability
- High stability
- Low co-efficient of expansion
- Fine grain structure
- Tensile strength 20,000 to 30,000 P.S.I.
- Elongation ½% to 1½% in 2 inches

Standard plate sizes 48" x 96", 48" x 144". Bar sizes up to 8" x 12' (machined 4 sides). Larger and smaller sizes to order.

WRITE FOR CATALOG detailing characteristics, advantages, sizes, etc., of Pioneer Cast Aluminum Plate Formula 921.

PIONEER TOOL ENGINEERING, INC.
12901 YUKON AVENUE, HAWTHORNE, CALIFORNIA

Russell & Company
6432 Cass Ave., Detroit
10 South Union Street, Bay Shore, Long Island
426 Transportation Bldg., Cincinnati
127 Crosby Avenue, Buffalo 17,

H. L. Hutchinson
140 N. E. Broadway, Portland

Lyons-Coleman, Inc.
P.O. Box 6028, Dallas 1, Texas

SPECIALISTS IN CAST ALUMINUM TOOLING PLATE AND ALUMINUM MACHINING

the engine to tell its speed. It simply taps into the frequency signal from a standard tachometer generator measuring engine speed, without affecting performance of the tachometer indicators normally connected to the generator, the firm explains. The speed switch draws 1.25 v.a. from the tachometer.

The model shown is adjustable from 58 to 62 cps. with a differential of 2 cps.; provides for continuous energizing of the relay above the set point. For filament supply, it uses 110 v. a.c., 400 cps. current. It will operate through −65 to 200F temperatures, can be engine-mounted if desired, is hermetically sealed and weighs 3 lb.

Manning, Maxwell & Moore, Inc., Stratford, Conn.

Triple-Duty Tool

A precision wire stripper-cutter suitable for probing into tight places in avionic gear is being produced by the C & G Mfg. and Sales Co.

The small cutting end of the tool is actuated by a lever on the handle. The wire stripper is located at the opposite end of the tool and may be pushed into the handle when not in use. Besides cutting and stripping, the tool provides a convenient means of holding wires and strands during soldering. Part fits in standard repair kit, says the maker.

C & G Mfg. and Sales Co., Columbus, Ohio.

ALSO ON THE MARKET

"Curta" calculator, a small hand-operated cylindrical "brain," sporting a series of dials, hand cranks and knobs, was developed by Swiss watchmakers to "combine portability of a slide rule with speed and accuracy of a large desk calculator." Weighing but 8 oz. and priced at $129, the device carries to five decimal places and totals to 99 billion, performs like electric computers costing $800, claims Curta Calculator Co., 5543 S. Ashland Ave., Chicago.

Chromate treatment helps give Kaiser Aluminum & Chemical Corp.'s new protective interleaving tissue for stored aluminum sheets the power to inhibit water staining. In addition, the paper itself prevents abrasion. A company photograph comparing stacked aluminum after use of the new interleaving, old-style interleaving, and no interleaving, was printed upside-down in this section Mar. 3. The actual photo shows the Kaiser chromate sheet as giving the most effective protection. Kaiser Aluminum & Chemical Sales, Inc., Oakland, Calif.

STEEL PRODUCTS—
the Source for Gears and Geared Units

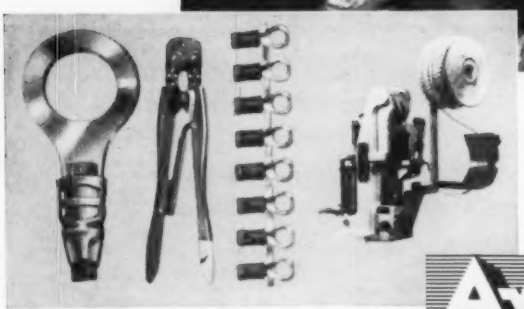
Want production of a single gear? A complete geared unit? The Steel Products Engineering Company can do the complete job, under one roof. We have our own engineering staff for design, test and development work, in addition to tool design, manufacture and approved quality control. Our facilities include complete up to date machining equipment, plus plating, heat treating, and welding. If you want precision contract manufacturing in a "package" make Steel Products your source.

THE STEEL PRODUCTS ENGINEERING CO.

ENGINEERS AND MANUFACTURERS • SPRINGFIELD OHIO

NOISE!

WE DEFY ANYONE TO DETECT ANY DIFFERENCE IN NOISE LEVEL BETWEEN AN AMP SOLDERLESS CONNECTION AND A PERFECT SOLDERED JOINT!



During recent years three laboratories, employing DIFFERENT test methods and the finest equipment yet developed, agree: THERE IS NO MEASURABLE NOISE IN THESE AMP SOLDERLESS CONNECTIONS!

TEST #1 AT MASSACHUSETTS INSTITUTE OF TECHNOLOGY

AMP terminal connections (which had been subjected to salt spray) were placed in series with the input of a high gain, wide band pass amplifier (originally developed for checking thermal noise in R.F. input circuits). Dr. Wiesner's results, after testing AMP terminals, substantiate "the unlikelihood that metal-to-metal contact as it exists in crimped solderless connections would be expected to develop noise"

TEST #2 AT AN ARMED FORCES TEST LAB

Since a terminal has but a few milliohms resistance, this test required a special transformer to match this low impedance to the input of the amplifier, sensitive to levels of 0.2 micro volt. 60 AMP solderless terminals crimped to short lengths of wire in series, a similar number of carefully soldered joints, and a single piece of solid wire of equivalent R, were compared.

No noise difference was detectable between any of the three.

TEST #3 AT A PROMINENT UNIVERSITY LAB

7,000 AMP solderless connectors were crimped to short lengths of wire in series making a chain of terminals 340 feet long (see illustration). After aging for two years in an unfavorable atmosphere these 14,000 connections in series were tested at radio frequencies up to 20 megacycles.

AGAIN — Noise measurements were down to thermal magnitude.

(Copies of all test results available on request to our ELECTRONIC DIVISION.)

CHECK THESE RESULTS YOURSELF! Use the Appropriate AMP Connection In ANY Circuit, Be It Low or High Level, DC or High Frequency!

AMP

AMP precision tools produce these uniform quality connections at production rates up to 4,000 terminations per hour!

AIRCRAFT-MARINE PRODUCTS, INC.

2100 Paxton Street Harrisburg 8, Pa.

AMP Trade-Mark Reg. U.S. Pat. Off.

LETTERS

'Noise Is Efficiency'

After reading your editorial, "Taming the Giant's Roar," I found myself distressed. When Capt. Robson touched on the same subject later in his column the situation changed. He is, I believe, classed as a technical writer. Robson is undoubtedly a very competent captain and his columns consistently hold the interest with their pertinent and enlightening comments on the problems facing the air transport industry, from the "Cockpit Viewpoint." His Oct. 15 column was excellent until the last three paragraphs.

Actually, your own expressed opinions on noise and Robson's last three paragraphs are completely at variance with your earlier remarks on a subject much more dear to your heart—lower fares and greater mass transportation by air.

Technically speaking, aircraft capable of supporting a lower fare structure and still enabling the operator to show a profit are noisier than their earlier model counterparts. This is true since the more efficient carrier has more power in the same outline and power means source noise. Two classic examples that come to mind are the change over from collector rings and tailpipes to jet stacks on the Connie and the use of jet stacks with the engines of the Super DC-3.

With the Connie, economics were conceivably the only factor but with the Super DC-3 it seems possible that the larger engines—with jet stacks—not only enhanced the economic character of the airframe but enabled it to meet the current Civil Air Regulations much more effectively.

The industry, both airframe and engine branches, possesses the know-how to make propeller-driven aircraft less offensive to the onlooker, noise-wise. . . . If, however, such knowledge were to be employed, the weight and aerodynamic losses would be unacceptable economically and might possibly introduce some safety hazard.

The reported treatment given the DC-3 and C-46 is interesting academically but applies to airframes which will not meet the current performance requirements for air carrier aircraft. On high performance ships the device would be impractical.

When the specter of jet aircraft is unwittingly raised—viz., letter from de Havilland, AVIATION WEEK, Nov. 26,—the industry must walk softly. The prospect of noise is awe-inspiring since the essence of efficiency in a turbojet engine is noise!

Presumably, in the interest of containing airports within their present envelopes, either partial after-burning or rocket assist, or both, will be standard with jet airliners.

It is my feeling that no practicable method for silencing the noise of such combinations will be found and when such departures are commonplace the area in the vicinity of airports will be an undesirable residential locale, indeed!

Fundamentally, Capt. Robson's comparing the airplane with the automobile is inaccurate. Autos are not required to perform to similar standards and aircraft are not the omni-present device the auto is.

The airport, and its associated activity and noise, is more truly analagous to the railroad yard. It has long been true that the vicinity of railroad yards is shunned as places of residence and it is the writer's opinion that the vicinity of large airports will suffer increasingly from the same treatment.

Shifting populations and losses in property value are both regrettable symptoms of changing times. Neither of these unpleasant developments is related to aviation alone but has accompanied the marches of society since the earliest days of history. Undoubtedly highly articulate segments of the affected populations will, from time to time, succeed in obtaining repressive statutes. Such statutes will prove impracticable of administration and will fall into disregard and ultimate repeal. Despite the hue and cry, if there be such, Idlewild is not about to become a desert in the Elysian Fields of southern Long Island, nor Newark a recreational park for the surrounding industrial populace. . . .

None of the foregoing should be taken as an indication that the writer enjoys noise anymore than the next man or that he can afford shrinkage in property values.

There is, however, the fact of foresight in choosing a dwelling locale and the inescapability of occasional public improvements. The residents of Greenwich, Conn., are no less unfortunate with their gas pipeline problem than the Virginian who happens to live in the vicinity of the new Washington airport. A little realism in the matter of aircraft noise would be helpful to all concerned.

THOMAS MCCLURE
25 Palmer's Lane
Swarthmore, Pa.

(Reader McClure is entitled to his opinion. We deplore it, and any other do-nothing attitude. The citizen who chooses a dwelling needs foresight, indeed. But aviation must have some foresight, too, on what inevitably will be an ever tougher problem of public relations. If it ever comes to a public-versus-industry battle, who do you think will win? Better start thinking and planning now. If there are no ways of helping alleviate noise now, we'd better start figuring on an honest-to-goodness cooperative effort of planning ways and means, and tell the public we've started working on it. Trouble—real trouble—is ahead.—ED.)

A Pilot Dissents

In the Jan. 14 AVIATION WEEK, there appears an article entitled "Pilots' Strike Threat Stumps Mediators." While I do not question the motive of the writer, it is almost a certainty that this release will serve to confuse the average reader of your publication, and indeed nearly anyone who is not completely familiar with the history of the dispute to which the article referred.

Specifically, what annoys me most is the impression which the writer tries to leave

ACCO products

CHECK

☐ **Shaped Wire***

— Flat
● Round
◙ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

☐ **Armature Banding Wire**

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

☐ **Lock Safety Wire**

Tough, durable, workable. In the size and type for your work.

☐ **Spring Wire**

Any shape* . . . high carbon . . hard drawn . . . high tensile . . . stainless . . . galvanized . . . tinned . . . bright.

*Cross-sectional areas up to .250" square; widths to ½"; width-to-thickness ratio not exceeding 6 to 1.

YOU do this—
Give us the specifications of the wire you need—or tell us details of job to be done.

WE'LL do this—
Send you recommendations, prices and delivery date. Samples on request. PAGE offers you a wide variety of wires to choose from.

Wire or Write Today

PAGE WIRE

ACCO

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

VOI-SHAN

"AVIATION IN ITSELF IS NOT INHERENTLY DANGEROUS—BUT LIKE THE SEA, IT IS TERRIBLY UNFORGIVING OF ANY CARELESSNESS, INCAPACITY OR NEGLECT"

With appreciation to *Curtiss-Wright Corporation, Wright Aeronautical Division,* for bringing to our attention these memorable words of C. R. Smith, president of *American Airlines.*

Aircraft Bolts carry a heavy load of responsibility—because they must FLY. VOI-SHAN bolts have a *proved* record of dependability in meeting all requirements of the aircraft industry.

VOI-SHAN MANUFACTURING CO., INC.
8463 HIGUERA STREET, CULVER CITY, CALIFORNIA • PHONE TEXAS 0-5321

Verified Strength BOLTS FOR VITAL SECURITY

in the lead paragraph. I refer, of course, to the statement that Pan American pilots threaten to strike if the airline "carries out a government order issued by the Civil Aeronautics Board." This is one of those instances with which we in labor organizations have grown so familiar in the past few years of "the truth, half told." As I have said, I do not question the writer's motive but I sincerely feel that by printing only a fraction of the story, you have done the patient and long-suffering veteran PAA pilots a great disservice in conveying the impression that they are threatening to strike solely in anger at a government order.

The veteran PAA pilots are threatening to strike about one issue which is crystal clear—the action of the company, Pan American World Airways, in deliberately violating the provisions of the employment agreement between the company and its veteran pilots. Whether or not the order came from CAB or some other quasi-judicial body, the important point for all employes to remember is that Pan American aided by the CAB is attempting to nullify a contract which was entered into in good faith under the terms of the Railway Labor Act, as amended: an action which at the very least should be taken only by a court of law qualified to render a fair and impartial decision on a matter of such grave import to the transportation industry.

The arguments concerning the pro and con of the dispute over relative seniority would fill volumes, but I believe it is fair to say that the veteran PAA pilots have made every reasonable effort to resolve the question amicably, including an offer to change their agreement to give former AOA pilots credit for all their service with AOA or its predecessor, American Export Airlines, in establishing relative seniority. This offer, and an offer to submit the matter to arbitration through the medium of the Air Line Pilots Assn., was flatly rejected by representatives of the former AOA pilots.

The CAB attempt to give former AOA pilots credit for their service with other airlines dating back to 1929 (including foreign lines) is so ridiculous that even the company admits the scheme is unworkable. As an example, it would give credit to former AOA pilots for service with the now non-existent Pan American Airways, Africa-Ltd., while veteran PAA pilots who also served with this company would receive no credit for such service. Even pilots dismissed by PAA for cause several years ago and subsequently employed by AOA would receive credit for service with PAA as well as AOA.

I realize that this dispute cannot be argued out in the columns of your magazine but I ask that you print this clarification in view of the erroneous impression which will be spread by the article previously mentioned.

My opinions, of course, are my own and while I am sure they represent the majority opinion of the veteran PAA pilots, I do not present them as such. Your publication has a reputation of fairness and I sincerely hope that if you allow yourself to be involved to the extent of printing controversial material, that you will present some of the abundance of factual material available.

JAKE M. MARCUM, JR.
Huntington, N. Y.

POINTING the WAY
To Continuing Prosperity

The set of figures in the middle of this page is news of high importance to every American.

In effect, it says that there is no basis in fact for all this talk about a collapse of capital expenditures plunging us into a depression following the industrial build-up for defense.

Such talk assumes that without defense orders business would spend relatively little for new industrial plant and equipment. The figures below show that that assumption is not justified.

A Record in '52

As was expected, their plans call for another record-breaking volume of capital expenditures by business in 1952. But, as many did not expect, the McGraw-Hill survey also discloses plans for very heavy capital expenditures in each of the three years following. Expenditures now planned for those years are, to be sure, lower than those planned for 1952. But the significant fact is not that they are lower. Experience shows that plans made several years ahead always overlook many expenditures that are needed later.

The significant fact is that the expenditures already planned for 1953-55 are so high. For example,

BUSINESS PLANS FOR NEW PLANTS AND EQUIPMENT (Millions of Dollars)

	Actual Spending 1950*	Actual Spending 1951*	McGraw-Hill Survey			
			Planned	Preliminary Plans		
			1952	1953	1954	1955
Manufacturing	7,491	11,141	12,921	10,028	8,525	8,194
Mining	684	806	943	415	321	358
Railroads	1,136	1,564	1,642	1,248	1,117	1,002
Electric & Gas Utilities**	3,298	3,676	3,948	3,360	3,204	2,748
Other Transportation & Communications	1,392	1,592	1,721	1,671	1,943	1,839
ALL INDUSTRY	14,001	18,779	21,175	16,722	15,110	14,141

*U. S. Department of Commerce
**Electrical World (A McGraw-Hill publication) and American Gas Association.

The figures come from the fifth annual McGraw-Hill survey of business plans for new plant and equipment. Companies were asked to report through that survey not only their plans for 1952, but plans they now have in hand for capital expenditures in 1953, 1954 and 1955, provided the money to carry them out can be obtained.

those now planned for 1955 would be higher than those of 1950, which, at that time, were second highest in our history.

If these plans are carried out we shall have an essential element of continuing prosperity. Sustained expenditures for capital expansion and betterment account directly for a large share of our employment and consumer income. Moreover, consistent modernization of industrial plant raises production efficiency and brings more and better goods and services within reach of more consumers.

It is not to be expected, of course, that we can come down from the peak of the defense boom without readjustments in some sectors of business. But if capital expenditures by business are carried out on the scale now planned, we shall be able to take any necessary readjustments in our stride, and continue to increase our industrial strength.

From V-J Day to the end of this year, manufacturing industries will have spent over $60 billion for new industrial plant and equipment. This is more than the value of all the plant and equipment these industries had on their books at the end of World War II. It is this heavy outlay that causes some, assuming most postwar plans for industrial expansion and modernization will be completed, to fear a collapse of capital expenditure.

Plans to Go Ahead

But American industry still has plans to go right ahead expanding and improving its facilities. This was the most striking single finding of this year's survey.* It disclosed also that after 1952:

– 83 per cent of the companies answering the survey are planning substantial further modernization.

– 48 per cent will need more capacity to make their present products.

– 33 per cent plan additional capacity to make new products.

It cannot be too strongly emphasized, however, that these plans represent what American industry *wants* to do. They are a concrete expression of hope and aspiration. As such they are extremely important, for they dispose of the idea that business considers the job of expanding and improving its facilities as finished, or anywhere near finished.

But the plans carry no guarantee of accomplishment. If they are to be realized, business must have the funds to carry them out. There is no assurance that the money will be available if the present level of corporation taxes is continued. Eight out of ten companies, according to the McGraw-Hill survey, will rely entirely on profits and reserves to finance their 1953-55 programs. So, in calculating their programs for these years, the companies were asked to assume relief from "excess profits" taxation.

Federal taxes now take at least 52 per cent of a corporation's profits, and 82 per cent of any profits in the so-called "excess profits" bracket. Despite this drain on their funds, companies are able to finance their 1952 programs because (1) they are borrowing heavily, and (2) many of them are getting government loans or special tax concessions on new facilities installed for defense purposes. But these are emergency aids.

Only Two Ways

When the present defense program tapers off, there will be only two ways by which business can possibly increase its principal source of funds for new plant and equipment. One way is to make more profits before the tax collector takes his cut. And the only way many companies, already operating at capacity and high efficiency, can do that quickly is by raising their prices. That is an unpopular method. Also, with the return to more competitive markets, it might be self-defeating.

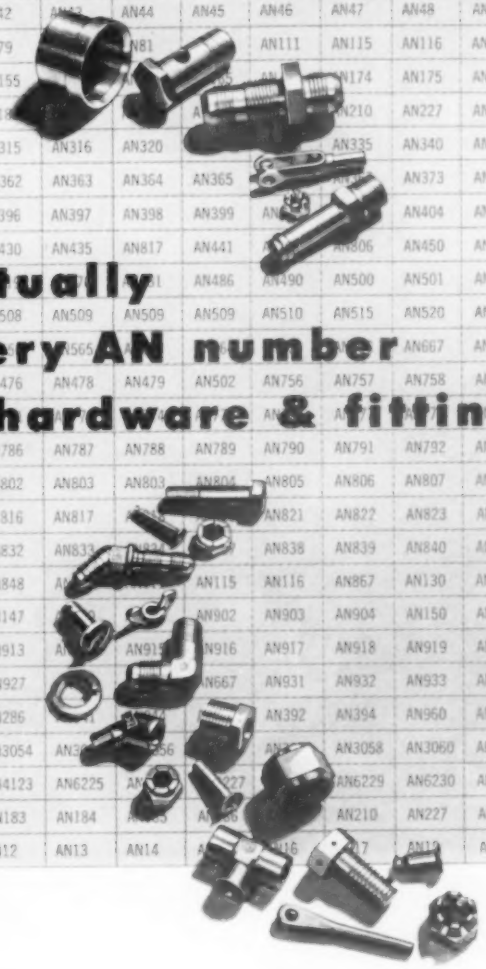
The other way is for the federal government to release its strangle hold on business profits. The so-called "excess profits" tax – the 82 per cent tax which is really a tax on business growth – should be repealed, effective January 1, 1953. And a cut in the basic tax of 52 per cent on all corporate profits should come not much later. That is by all odds the most important single step toward assuring that business plans already made for capital investment in 1953, 1954 and 1955 are carried out. It is the most important single step toward sustaining our present prosperity.

Through its plans for continued expansion and improvement of its facilities, American business clearly points the way to avoid the depression that so many have feared – and the Communists have so ardently hoped – would follow the peak of defense mobilization. It will be a tragedy for our country and for Americans in every walk of life if we do not insist that business get the chance to follow this wise and constructive course.

McGraw-Hill Publishing Company, Inc.

***Note – A copy of the full report of this survey can be obtained by addressing: Department of Economics, McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 36, N. Y.**

AN3	AN4	AN5	AN6	AN7	AN8	AN9	AN10	AN11	AN12	AN13	AN14	AN15	AN16
AN17	AN18	AN901	AN20	AN21	AN22	AN23	AN24	AN25	AN26	AN27	AN28	AN29	AN30
AN32	AN34	AN36	AN42	AN43	AN44	AN45	AN46	AN47	AN48	AN49	AN73	AN74	AN75
AN76	AN77	AN78	AN79	AN81			AN111	AN115	AN116	AN130	AN135	AN140	AN145
AN146	AN147	AN150	AN155					AN174	AN175	AN176	AN177	AN178	AN179
AN180	AN181	AN182	AN183					AN210	AN227	AN227	AN227	AN230	AN231
AN286	AN287	AN310	AN315	AN316	AN320			AN335	AN340	AN341	AN345	AN350	AN355
AN500	AN360	AN361	AN362	AN363	AN364	AN365			AN373	AN380	AN381	AN385	AN386
AN392	AN394	AN395	AN396	AN397	AN398	AN399			AN404	AN406	AN415	AN416	AN420
AN425	AN426	AN427	AN430	AN435	AN817	AN441		AN806	AN450	AN455	AN456	AN807	AN809
AN916	AN917					AN486	AN490	AN500	AN501	AN502	AN503	AN504	AN505
AN506	AN507	AN507	AN508	AN509	AN509	AN509	AN510	AN515	AN520	AN525	AN526	AN530	AN531
AN535	AN961								AN667	AN668	AN669	AN735	AN737
AN471	AN472	AN473	AN476	AN478	AN479	AN502	AN756	AN757	AN758	AN759	AN760	AN761	AN762
AN763	AN185										AN780	AN781	AN782
AN783	AN784	AN785	AN786	AN787	AN788	AN789	AN790	AN791	AN792	AN793	AN794	AN795	AN800
AN801	AN801	AN802	AN802	AN803	AN803	AN804	AN805	AN806	AN807	AN809	AN373	AN380	AN812
AN813	AN814	AN815	AN816	AN817			AN821	AN822	AN823	AN824	AN825	AN826	AN827
AN828	AN829	AN830	AN832	AN833			AN838	AN839	AN840	AN841	AN842	AN843	AN844
AN845	AN846	AN847	AN848			AN115	AN116	AN867	AN130	AN135	AN140	AN871	AN145
AN893	AN894	AN146	AN147			AN902	AN903	AN904	AN150	AN155	AN161	AN162	AN909
AN910	AN911	AN912	AN913		AN915	AN916	AN917	AN918	AN919	AN920	AN921	AN922	AN923
AN924	AN925	AN926	AN927			AN667	AN931	AN932	AN933	AN509	AN935	AN936	AN936
AN937	AN938	AN939	AN286				AN392	AN394	AN960	AN961	AN970	AN975	AN435
AN3051	AN3052	AN3053	AN3054	AN3	56			AN3058	AN3060	AN3061	AN3062	AN3063	AN470
AN3066	AN3068	AN4122	AN4123	AN6225	AN	227		AN6229	AN6230	AN6231	AN6289	AN6290	AN509
AN180	AN181	AN182	AN183	AN184				AN210	AN227	AN227	AN227	AN230	AN231
AN8013	AN10	AN11	AN12	AN13	AN14		16	27	AN1	AN803	AN20	AN21	AN22

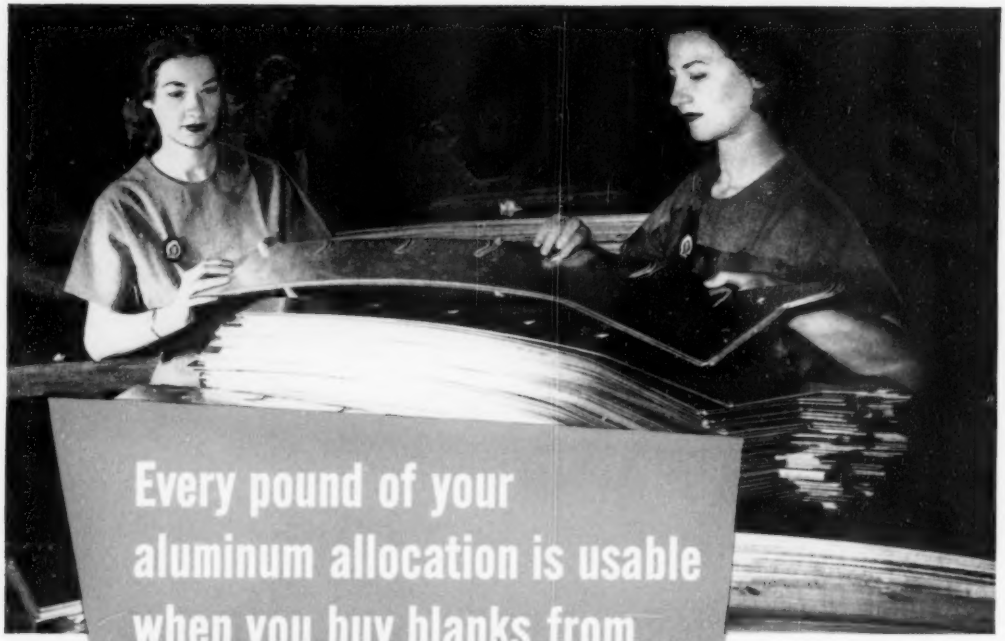


virtually every AN number in hardware & fittings

FOR AIRCRAFT, GUIDED MISSILES AND RELATED ASSEMBLIES . . . Dumont is especially qualified to supply the many hardware and fitting items required by your contract. We produce our own fittings and distribute hardware made by America's leading manufacturers. Huge stocks, inspected and certified for immediate use, are available from our warehouses throughout the U.S.

DUMONT AVIATION *Associates*

1401 FREEMAN AVENUE • LONG BEACH 4, CALIFORNIA
Phones 904-931 • NEvada 6-5341 • WUX-Long Beach or Teletype LB 88-138
ENGLEWOOD, NEW JERSEY • KANSAS CITY, MISSOURI
DAYTON, OHIO • DALLAS, TEXAS



Every pound of your aluminum allocation is usable when you buy blanks from...

REYNOLDS FABRICATING SERVICE

Saves an average 30% scrap loss, plus scrap handling

Scrap from shearing and blanking is remelted immediately at Reynolds plants without costly loss of time, segregation and storing, reshipment between cities, or diversion of valuable metal. You can use *all* of the aluminum you receive . . . without delay . . . without scrap loss. In addition, you realize important savings in handling, storage space, work space and manpower.

Reynolds Aluminum Fabricating Service offers extensive facilities to produce semi-fabricated blanks, completed parts and final assemblies. Quotations on aluminum blanks or parts can be furnished to your drawings and specifications. Technical assistance from aluminum fabricating specialists is available for your problems.

For additional information, write for literature, or call the Reynolds office listed under "Aluminum" in your classified telephone directory. Reynolds Metals Company, Parts Division, 2059 South Third Street, Louisville 1, Kentucky.

Reynolds Aluminum Fabricating Facilities

One of the country's most complete facilities for aluminum fabricating includes:

- Over 100 mechanical presses ranging from 5 to 1700 tons.
- Hydraulic presses from 50 to 500 tons.
- Equipment for shearing, blanking, forming, riveting and welding, roll forming, finishing and assembly.

These facilities can assure a steady flow of blanks or fabricated parts to your specifications and production requirements.

BE SURE TO see The Kate Smith Evening Hour every Wednesday, NBC-TV, hear The Big Show with Tallulah Bankhead every Sunday, NBC Radio Network . . . consult newspaper for local time and station.

REYNOLDS METALS

REYNOLDS ALUMINUM FABRICATING SERVICE

BLANKING • EMBOSSING • STAMPING • DRAWING • RIVETING • FORMING • ROLL SHAPING • TUBE BENDING • WELDING • FINISHING

FACTS FOR FILING

A Reference Service to Help YOU

What important aviation reference or source material would you like to see in this new service feature? Aviation Week's world-wide fact-gathering organization brings us important source material that does not regularly find a place in any aviation source book. This department is an experiment in serving you as a reference aid. We shall publish for a trial period some of the newest aviation background of permanent value. If you'd like to see certain reference data, write: The Editors, Aviation Week, 330 West 42 Street, New York 36, N. Y.

Employment Figures
U. S. Scheduled Passenger Carriers

Year (Dec. 31)	Total	Pilots and copilots	Other flight personnel	Purers, stewards, stewardesses	Meteorologists and dispatchers	Mechanics	Other hangar and field personnel	Office employees	All others
DOMESTIC									
1928[1]	1,496	308	0	0	0	525	663	0	0
1929	1,958	514	0	0	0	958	486	0	0
1930	2,778	616	0	0	0	1,416	746	0	0
1931	4,314	622	0	0	0	1,671	1,006	1,015	0
1932	4,020	640	0	0	0	1,641	939	800	0
1933	4,369	690	0	0	0	1,810	1,089	780	0
1934	4,301	667	0	0	0	1,650	923	961	0
1935	5,945	874	0	213	0	2,016	470	2,372	0
1936	7,079	1,055	0	333	0	2,164	548	2,981	0
1937	7,586	1,064	0	339	0	2,228	658	3,297	0
1938[2]	9,008	1,138	0	356	186	2,430	712	3,715	472
1939[3]	10,639	1,412	0	536	181	2,622	877	4,583	228
1940	15,984	1,939	18	914	193	4,054	1,890	5,855	1,131
1941	19,223	2,217	19	1,028	220	4,423	2,224	7,807	1,265
1942	26,910	2,194	112	733	1,881	9,348	2,969	7,717	2,236
1943	29,654	2,125	8	845	1,685	8,271	3,356	10,073	2,391
1944	31,198	2,579	11	1,322	1,870	7,136	3,309	12,201	2,270
1945	50,313	4,967	108	2,075	2,613	10,944	7,012	19,241	3,433
1946	69,182	5,712	98	3,342	3,877	16,107	10,307	24,626	5,413
1947	58,998	5,034	141	3,061	2,618	15,366	8,409	22,012	2,317
1948	60,416	5,307	312	3,038	2,612	16,428	9,222	21,396	2,101
1949	59,896	5,237	642	3,198	2,497	15,674	9,356	21,136	2,145
1950	61,901	5,785	776	3,372	2,450	15,788	9,822	21,894	2,016
1951	68,634[4]	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.
INTERNATIONAL									
1928	[5]	[5]	[5]	[5]	[5]	[5]	[5]	[5]	[5]
1929	387	48	0	0	0	224	115	0	0
1930	697	81	0	0	0	405	211	0	0
1931	1,353	72	0	0	0	390	549	342	0
1932	1,560	77	0	0	0	435	576	502	0
1933	1,926	77	0	0	0	517	750	584	0
1934	2,276	92	0	0	0	558	928	698	0
1935	2,407	121	0	0	0	602	1,048	636	0
1936	2,916	186	0	57	0	710	1,221	742	0
1937	4,000	291	0	81	0	1,050	1,698	880	0
1938	4,266	278	0	93	0	977	1,923	995	0
1939	5,275	287	7	103	0	1,181	2,138	1,559	0
1940	6,067	340	15	122	0	1,359	2,397	1,834	0
1941	7,235	447	30	182	0	1,966	2,707	1,903	0
1942	12,803	952	129	378	29	3,534	4,415	3,366	0
1943	9,925	207	332	147	511	2,140	1,935	1,859	2,804
1944	11,409	486	366	194	631	2,827	2,239	3,033	1,752
1945	17,968	930	938	411	864	5,099	2,435	4,663	2,628
1946	27,372	1,508	1,405	1,079	1,454	7,269	2,463	6,961	5,233
1947	26,154	1,003	1,152	1,016	1,211	5,774	3,201	10,679	1,518
1948	24,192	1,619	1,303	1,104	1,049	5,400	2,440	9,749	1,628
1949	21,108	1,586	960	1,142	1,094	3,861	2,338	9,012	1,125
1950	20,883	1,492	745	1,055	953	3,818	2,424	9,244	1,142
1951	20,893	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.	N. A.

[1] Employes of Pan American Airways included.
[2] Does not include Colonial and Marine.
[3] Does not include Marine.
[4] As of Sept. 30, 1951.
[5] Included with Domestic Air Carrier Operations data.
N. A.—Not available.

SOURCE: 1928-41—CAA; 1942-50—Bureau of Air Operations, CAB. *Aviation Week, 3-24-52*

Air Force Wing

Before the Air Force received autonomous status in September, 1948, its basic operational unit was the combat group. Today it is the wing.

Previously a combat group shifted from air base to air base, receiving maintenance and support from resident base personnel. Under the present setup, all of the functions involved in keeping a combat group in the air are united in the wing.

A wing has four main subdivisions:

- **Combat Group**—containing all the wing's combat aircraft.
- **Maintenance and Supply Group.**
- **Air Base Group.**
- **Medical Group.**

When a combat group is transferred, all the other groups move with it. The wing commander automatically takes command of and completely staffs the new air base, of which his combat group is merely a segment. Only in rare and extraordinary circumstances does a combat group move by itself.

While cumbersome logistically—combat group personnel represents but a quarter of the wing's total—this system is supposed to speed up operational efficiency. Airmen and ground crews train together from the start. The medical and air base groups familiarize themselves with the particular needs of their unit.

An activated wing is presumably a well manned production line capable of rapid delivery on its commitments. The usual "get-set" period required to debug a big operation is cut to the bone.

Wing organization is still under revision. Final patterns have not been set. But chances are that the single unit structure is a permanent innovation.

Aviation Week, 3-24-52

Army Aviation In Korea

Total combat missions by Army aircraft	64,541
Administrative missions	76,251
Total hours flown by Army aircraft	186,372
Total planes lost due to enemy action	10
Pilots killed due to enemy action	9
Pilots wounded due to enemy action	16
Observers killed due to enemy action	3
Observers wounded due to enemy action	8
Total casualties not due to enemy action	2

SOURCE: Department of Defense. *Aviation Week, 3-24-52*

Airlines Test CAB Life-and-Death Power

- **Western and United open court fight on Board order suspending service to points served by other lines.**
- **They say the basic issue is not those routes, but the permanency of all their certificates.**

Can the Civil Aeronautics Board compel an airline to stop serving a city or a route for which it is permanently certificated?

CAB says yes.

But United and Western Air Lines are prepared to go to the U. S. Supreme Court, if necessary, to defeat this CAB contention.

The airlines filed briefs two weeks ago to the U. S. Circuit Court of Appeals in San Francisco asking the court to rule that CAB does not have the power to suspend a permanent airline certificate unless for violation of the Civil Aeronautics Act or regulations.

▶ **The Real Issue**—This is the opening gun in a case that will set a precedent on the basic question of whether CAB can or cannot change the routes of a certificated airline at will. United and Western fear that if the Board can put them out of the few towns at issue, it may some day use that as a precedent enabling the Board to take them out of more important routes.

Once the precedent were to be established, the airlines contend, their route investments would be jeopardized.

The specific cases of Western and United v. CAB are:

- **Western service to Yuma, Ariz.**, and El Centro, Calif., was ordered suspended by CAB, which authorized Bonanza to serve those points instead. Western won a 20-day stay against the order in court, and United has filed a brief "amicus curiae" (friend of the court).
- **United service to Santa Barbara**, Monterey, Red Bluff and Eureka, Calif., was suspended by CAB because Southwest Airways serves those cities. Another Board order would suspend UAL service to Rock Springs, Wyo., also served by Frontier Airlines. In the U. S. Court of Appeals in Chicago, United won a stay of both these orders, the California order until June 1.

First detailed argument over the basic issue at stake in these cases appears in the rush briefs just filed by United and Western in the California court, and in the CAB opinions suspending their services to the towns specified.

CAB is as determined to prove its power to suspend certificates as the airlines are to disprove it. As one Board attorney put it: "The Board giveth and the Board taketh away." The Western case in the San Francisco court, and/or the United case in Chicago court will be a long step toward settling the question of how far CAB can go with its suspension power. This issue has never been carried through the courts before, as previous suspensions have been voluntary or else the airlines did not take the CAB suspension orders to the courts.

Both CAB and airline attorneys told AVIATION WEEK that the main question involved is: Can CAB suspend a certificate in "the public interest"—when there's no question of the airline's fitness? If so, can the Board only make little changes in the route pattern of a certificated line, or can it suspend whole route segments?

▶ **CAB's Case**—The Board in its opinion on the Southwest renewal-United suspension case adopted the reasoning of Examiner Paul Pfeiffer on the issue of whether or not the Board has power to suspend United from the four California towns.

Congress granted CAB power to do so in Section 401(H) of the Civil Aeronautics Act, Pfeiffer states. The pertinent clause is: "The Authority . . . may alter, amend, modify or suspend any such certificate, in whole or in part, if the public convenience and necessity so require. . . ."

Then Pfeiffer cites a previous court ruling as precedent for broad interpretation of the Board's powers under 401(H): "The power of the Board to suspend a certificate to engage in foreign air transportation upon petition of a competitor was affirmed by the Court of Appeals for the District of Columbia in Pan American Grace v. Civil Aeronautics Board in the following language: 'It is clear from this provision that the Board had the power, after notice and hearing, to grant Panagra's petition and to suspend Braniff's certificate, subject to the President's approval'." (However, the Board decided not to suspend Braniff.)

Finally, the examiner concludes "there being no property in a certificate of convenience and necessity its revocation, and a fortiori its suspension, involves no confiscation."

▶ **Carriers' Case**—Western's brief to the California court, supported by United's amicus curiae, puts a different interpretation on section 401(H).

The airlines contend that the CAB suspension order is not a temporary suspension in the meaning of the Act, but in affect is a revocation. They point out that in the foreseeable future the Board has no intention of reinstating Western on the routes the Board is transferring to Bonanza. And the Act says CAB cannot revoke a certificate except "for intentional failure to comply with any provision" of the Act or regulations.

Second, the airlines say the suspension power granted in 401(H) is not only temporary but also was meant by Congress to cover only circumstances such as "ghost" towns which no longer must be served for public convenience and necessity.

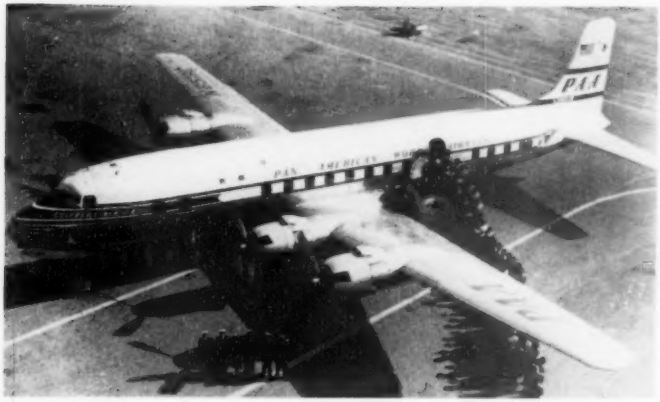
Third, the lines contend that even if the Board could suspend a certificate indefinitely, that would be a violation of the Fifth Amendment (due process clause) of the Constitution if there were no compensation for the loss. They claim that there are three property losses involved in an indefinite suspension of this route:

- **Past losses** incurred while building up the routes, losses that can never be recovered if the route is taken away now.
- **Future profits** inherent in the present turn to profitable operation of these routes.
- **The physical assets** tied up on the operation.

Those are among the chief arguments of the airlines.

▶ **Temporary, Not Permanent**—CAB's answering brief is expected to rely strictly on the letter of the Civil Aeronautics Act. The suspension of the certificate is not a revocation. No one can assume that the Board will continue the suspension forever. Technically, it is only a temporary suspension, and it is in what the Board believes best for public convenience and necessity.

Outlook is for a long, hard court fight. United President W. A. Patterson is well-known for holding to a principle in which he believes. He intends to make this the test case on a principle.



EXTERIOR VIEW of PAA DC-6B looks same as any 6B to passengers filing in, but . . .

INTERIOR VIEW shows a different kind of plane with high-density spacing, new seats.

PanAm Shows Off Its Ocean Coach

New 82-passenger DC-6B put on Bermuda route until Atlantic service opens. It may set pace for ocean run.

A laboratory for trans-Atlantic air tourist service started testing public and competitive reaction last week.

Every weekend from now until May 1 and perhaps occasionally after that, Pan American Airways' spanking new Douglas DC-6B air coaches will fly passengers roundtrip to Bermuda for $85. Beginning May 1, the DC-6Bs will be used on PanAm's trans-Atlantic tourist service ($486 roundtrip New York-London). They will be the only new, designed-for-the-purpose transports on the trans-Atlantic tourist run.

▶**The New Service**—The Bermuda service is giving PAA a chance to gauge passenger acceptance of its new planes; passengers a chance to see how they might like a 12-hr. ocean flight in a tourist plane; and the airlines a chance to size up the kind of competition they will get from PanAm's DC-6Bs.

The DC-6B competition on the Bermuda tourist service is primarily DC-4 and DC-4M. PAA's plane cuts nearly one hour off the time of other planes. It is pressurized, has a wider choice of smooth-flight altitudes. On the trans-Atlantic tourist service, the DC-6B initially will meet the same type planes, plus the Constellation. It will have a speed advantage over all, no pressurization advantage over the Connie, but with perhaps a small increase in comfort.

On a one-day preview flight to Bermuda, PAA's "Liberty Bell" clipper raced from New York to the Atlantic island in 2 hr. 32 min. with a 66-mph tailwind pushing it along at 350 mph. ground speed. Northbound, the plane bucked a 40-mph. headwind, completing the trip in 3 hr. 29 min. at a ground speed of 250 mph. A DC-4 flying to New York at the same time required 4 hr. 26 min. The PAA plane flew at a 16,000-ft. elevation, the DC-4 at 8,000 ft.

▶**What Happens Now?**—Last year, Pan American carried 68,656 passengers both ways New York-Bermuda. Almost one-half went coach. PAA's only U. S.-flag competitor, Colonial, flew 40,637 passengers both ways. Colonial operates one daily 52-passenger DC-4, first-class plane, at the $85 roundtrip tourist rate. Considering PAA's greater frequencies and greater organization, Colonial has done well.

Colonial feels it will continue to thrive, despite the competition of the Super-6. President Branch T. Dykes told AVIATION WEEK: "We welcome competition. Our Bermuda business continues to show big gains (75% gain in 1951 over 1950) and we feel that our Montreal-U. S. domestic route set-up, making it possible for our passengers to go from many Eastern points as well as Canada on our planes to our Idlewild terminal and then to Bermuda, gives a real advantage."

To some extent, PAA shares that view. Vice President Willis Lipscomb points to Colonial's advertising a coach fare in first-class planes, and to its domestic routes as the reasons why Colonial will remain a strong competitor.

▶**Effect on Atlantic**—Those factors to a certain degree will also influence the flow of trans-Atlantic coach traffic. TWA and Trans-Canada on this continent have strong domestic routes to feed their overseas flights, and, in the bargain, TCA will operate only coach flights in first-class planes. Abroad, almost every foreign competitor can rely on business from domestic routes and some also will operate only coach. But Pan American's DC-6B, specially designed for coach, may offset those competitive factors.

New Alphabet Code Effective Apr. 1

The CAA has set Apr. 1 for inauguration in the U. S. of the new international alphabet adopted recently by the International Civil Aviation Organization (AVIATION WEEK Jan. 14, p. 78). However, CAA says the new alphabet is not mandatory for pilots inside the U. S. on domestic flights. But replies by CAA personnel will use the international code exclusively after Apr. 1.

CAB Sets Causes Of Crash-Landing

Probable cause of the recent crash-landing of a Peninsular Air transport C-46D shortly after takeoff from Midway Airport, Chicago, with 49 passengers is analyzed by CAB as: "Taking off at too low an air speed to maintain single engine flight, followed by a critical loss of power from the left engine, and subsequently a partial loss of power from the right engine, conditions which were aggravated by the effects of the overload."

The Board finds that "the main factors . . . were the malfunctioning of the ignition system of the left engine and the overloading of the aircraft."

▶ **Here's CAB Analysis**—Left engine of the C-46 failed shortly after takeoff because of a "blowback" into the intake pipe following burning and overheating of a spark plug. That plug had been installed in a partially burned out bushing because a new bushing was not available at the time. CAA has filed charges against the carrier, the captain who okayed the bushing installation and the Butler Co. service manager, who also okayed the bushing installation.

CAB concluded that the plane was overloaded by about 1,860 lb. or 3%, based on estimated fuel consumption and refueling after leaving Miami with a known amount of fuel the previous day. The accident occurred Sept. 16, 1951. There were no fatalities.

82 New Transports Approved by ACC

The Air Coordinating Committee has recommended materials priorities for production of 82 new transports recently ordered by airlines. This is in addition to the 357 firm orders already approved by Defense Production Administration for production the next 2½ years.

ACC has also recommended DPA approval of enough materials for manufacture of 11,379 civilian light planes the next 2½ years, at an average of 3,500 a year—maximum rate approved previously by DPA.

Observers expect swift approval of the 439 airliners and 11,379 light planes scheduled on this so-called C-6 program which has been recommended by ACC.

The new C-6 program covers monthly production schedules for 2½ years from the second quarter of this year (starting Apr. 1) through the third quarter of 1954. The 82 new firm orders included are an addition to the 357 carried over from last quarter's C-5 program (AVIATION WEEK Feb. 18, p. 16).

Here is the breakdown of new firm orders recommended for DPA approval by ACC:

Douglas DC-7, 29; Douglas DC-6B, 35; Lockheed 1049B, 5; Lockheed 1049C, 2; Convair 340, 11. Total new orders, 82. Previously ordered, 357. Total on order now, 439.

Airline Competition Check Urged by Ryan

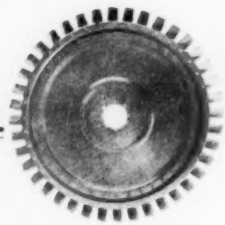
CAB Vice Chairman Oswald Ryan has urged that CAB and the airline industry hold a tight rein on airline competition, curb equipment expansion and tailor fares to costs. Ryan gave his views on those controversial subjects of present-day airline economics in a speech to the Aero Club of Washington.

Ryan is regarded by Washington observers as the leader of an uncertain CAB majority leaning to the non-competitive viewpoint. CAB Members Josh Lee and Joseph Adams generally lean toward sponsorship of competition where it can be shown to be non-destructive. These opposing viewpoints have led to long deliberations at CAB the past year on such cases as southern

HOW DEAN & BENSON RESEARCH, INC.

Serves the

AIRCRAFT INDUSTRY



The above engine-cooling fan—built by *THE BENSON MANUFACTURING COMPANY, KANSAS CITY, MISSOURI*—has been engineered by DEAN & BENSON RESEARCH, INC., with fan blades shock-mounted to eliminate transmission of vibration from the engine to the blades. This mounting is patented under U. S. Patent No. 2,436,087.

Designed for low weight, high inertia and high aerodynamic efficiency, these fans not only supply all necessary engine cooling, oil cooling, and carburetor air for submerged power plants, but also act as the flywheel for the engine.

The fan blade shown above is typical of all blades used in DEAN & BENSON RESEARCH, INC., designs. These blades are available in plastic, aluminum or magnesium.

DEAN & BENSON FACILITIES ARE DESIGNED FOR PROVING PERFORMANCE

Facilities Available for:

- Fan Research
- Engine Cooling Testing
- Package Power Plants
- Power Plant Cooling Development
- Fan and Blower Calibration
- Oil Cooler and Carburetor Air Scoop Development and Testing
- Propeller Spinner and Blade Cuff Research

DEAN & BENSON RESEARCH, INC.

16 Richmond Street **Clifton, New Jersey**

Kansas City Office: 1811 Agnes Avenue, Kansas City 1, Missouri

service to the west, nonscheduled airline investigation, coach fares, merger and interchange applications.

Excerpts from Ryan's talk:

• **Competition.** CAB already has recognized the fact "that there may be and probably are instances of uneconomic and unnecessary duplication in our present route pattern." Ryan says over-expansion of airline routes and competition arose from over-optimism about airline business after World War II. He says the Civil Aeronautics Act prescribes "a policy which seeks to avoid the evils of monopoly on the one hand and the anarchy of unrestrained competition on the other."

• **Equipment Expansion.** "What will be the effect upon the domestic trunkline air carriers of this (current 60%) increase in capacity which will be accomplished by the end of next year? Necessarily . . . nearly $400 million of increased annual revenues over the level of less than a year ago would be required to sustain the increased capacity at the current load factors. . . . This increase of capacity as planned by the domestic trunklines may very well present one of the economic uncertainties on the airline horizon which neither the industry nor the government can afford to disregard."

• **Business Outlook.** "If we were to be confronted with anything like the air carrier depression of 1947 and 1948 the profits in this industry would disappear overnight . . . If those facts are ignored in the planning for the future, our air transportation systems stands to be grievously damaged."

• **Fares.** "Fares must reflect costs, and costs can be controlled and lowered only if efficient airline management and sound regulatory policies make the achievement of cost economies possible. The airline industry, like other public utility industries, must operate under public regulation and the major purpose of that regulation must always be to assure the soundest economic conditions possible of attainment for the industry regulated."

• **Costs:** "Rising costs are beginning to outstrip the airline economies. . . . Profit trends promise to be downward."

Air Fares Climb In New Zealand

(*McGraw-Hill World News*)

Melbourne—The government-operated New Zealand National Airways Corp. is raising its passenger fares some 8% this month on all domestic flights and is also increasing air mail and air freight rates to certain destinations.

One reason for the raise, according to observers here: The carrier was giving the state-owned railways and buslines too much competition, price-wise.

NEWS Edo NOTES

EDO FLYING LIFEBOATS IN RESCUE OFF GUAM

Barely minutes after crew members had bailed out of a crippled B-29 weather plane 150 miles northwest of Guam, two Edo-built A-3 lifeboats of the Air Rescue Service were dropped to survivors.

OFF TO THE RESCUE! Airmen wheel an Edo A-3 lifeboat into position under SB-29 after which wheels are detached. 100 foot parachute lowers boat.

The first boat was dropped before the survivors were barely wet. It descended by parachute from an SB-29 of Flight D of the 11th Air Rescue Squadron which had been sent out to intercept the disabled plane. As the B-29 was being accompanied back to Guam, it exploded.

Survivors parachuted into the water and as soon as they were down, the SB-29 dropped its welcome A-3 which has a 25 hp engine, can cruise over 500 miles and has clothing and provisions for 15 men. A second A-3 boat was dropped by another Air Rescue SB-29.

The A-3 lifeboats are now stationed at strategic points on the world-wide routes of the Military Air Transport Service to assure swift rescue for survivors of marine and air disasters. Designing and building this 30 foot, ton-and-a-half boat is but one of a wide variety of design and manufacturing projects undertaken by Edo where research and development are combined so well with good production know-how for anything from precision aluminum fabrication to advanced electronic equipment.

Edo CORPORATION
COLLEGE POINT, NEW YORK

ALLEN LEADS THE WAY
IN FUEL SYSTEM COMPONENTS

How Allen, a recognized leader in the design and production of fuel system components, serves today's fast-moving aircraft industry.

Pictured is a Pressure Relief Valve designed by Allen engineers for the North-rop F-89 Scorpion.

SPECIFICATIONS:
FITTINGS, AND 10056-4, CRACKING PRESS. 50 psi., WT. 1 oz., TEMP. RANGE -65° to 160°F., PROOF PRESS. 150 psi.

Contact Allen or an authorized representative today with your special requirements and specifications.

NEW YORK CITY AREA: Bruce Charles Co., 53 Park Place. Phone: BArclay 7-0916
LOS ANGELES & WEST COAST: Thorson Co., 1644 N. Orange Grove Ave. Phone: HEmpstead 3007

ALLEN AIRCRAFT PRODUCTS, INC.
P. O. Box 29 Ravenna, Ohio Phone 7533

Save Maintenance Time and Costs with

WELDED CONSTRUCTION UNITS

- Propeller and Engine Dolly
- Fuel Pressure Tanks
- Engine Maintenance Stands
- Engine & Shipping Containers

Engineered to Your Specifications

Having done extensive engineering and development for the government agencies, we can provide the "know-how" and production facilities for your toughest fabricating problems.

2035 West 14th Street
Cleveland 13, Ohio

THIS DESIGN APPROVED BY
WELDED CONSTRUCTION ENGINEERING CO.
• ENGINEERING
• DESIGNING
• FABRICATING
2035 WEST 14TH STREET, CLEVELAND 13, OHIO

Introducing the

B.O.A.C. HYDROSTATIC WEIGHING UNIT

for weighing aircraft of any size

ACCURATE
PORTABLE
RELIABLE

ALL ENQUIRIES TO THE SOLE DISTRIBUTORS

KENTON EQUIPMENT Ltd.

48, BROOK STREET, LONDON, W.1.
Mayfair 3747

Manufactured by ALLTOOLS LTD., GT. WEST ROAD, BRENTFORD, MIDDLESEX

Beckworth vs. PAD on Aviation Gas

The airlines have gained a champion in the House Interstate and Foreign Commerce Committee on their fight against government-enforced use of aviation gasoline of extra-high content of lead tetraethyl during the av gas "shortage" that Interior Dept. claims exists now.

Rep. Lindley Beckworth, chairman of the House Aviation Subcommittee, has asked Interior Secretary Oscar Chapman to make the Petroleum Administration for Defense "immediately" revoke the recent order increasing lead content of av gas from 3.0 milliliters per gallon to 4.0 domestically and 4.6 internationally.

Beckworth's plea followed recent hearings in which the airlines and Pratt & Whitney, makers of most current airline engines, testified that the PAD order increasing lead content of av gas requires more replacement of critical engine parts and more risk of engine failure on takeoff and in flight (AVIATION WEEK Mar. 17, p. 79).

But PAD Administrator Bruce K. Brown told AVIATION WEEK that the airline and engine manufacturer testimony at the House hearings was "still just a lot of talk as far as I'm concerned." He said many airlines have always used the same lead content that his order forced on domestic lines as of last Oct. 1.

The airlines contend, however, that they've used 4.0 gas only where 3.0 was not available. And the international operators contest the PAD order raising their lead content to 4.6 as higher than they've ever used in normal times.

CAB Raises Coach Fare N.Y.-Chicago

Despite its battle to get airlines to lower coach fares, CAB raised them on one route, at American Airlines' insistence.

Pre-cut transcontinental air coach fare was $110, with $35 between New York and Chicago. Then United filed at $88-$99 transcontinental, with $24 New York-Chicago. CAB said that was too low. CAB said $99 and $29 would be about right. TWA filed $99 transcontinental and $29 (4 cents a mile) between New York and Chicago. United announced they would come up to that.

But American said CAB, TWA and United were still thinking wrong. They thrashed it out down at the Board. American got CAB to raise the New York-Chicago rates of TWA and United to $32, the rate filed by American. That's 4½ cents a mile, ceiling for day coach rates under announced CAB policy.

Britain to Levy Landing Charge

(McGraw-Hill World News)

London—Beginning May 1, airline operators using state-owned airfields in England and Scotland will have to pay the government a "service charge" for each passenger they land, varying from $1.04 if the passenger arrives from outside Europe, to 70 cents if he arrives from Europe. Passengers in transit are exempt.

Airlines agree that the charge will

RIO'S NEW PASSENGER TERMINAL

New passenger terminal at Rio de Janiero's Galeao International Airport is located closer to the city, saves passengers at least ten minutes previously spent in circling the field after leaving former temporary structure on the far side of the field. New buildings were formerly used by the Brazilian Air Force. Installation was further improved by addition of approximately 215,000 sq. ft. of concrete apron.

have to be passed onto the passenger. The Ministry of Civil Aviation will bill the carriers periodically on the basis of their passenger lists. Expected income: about $588,000 yearly.

British operators have vigorously protested the new charge. British European Airways Chairman Lord Douglas figures it will add $280,000 to BEA's costs; BOAC puts the cost at $112,000-$140,000.

SHORTLINES

▶ **Air Carrier Communication Operators Assn.,** affiliate of ALPA, has elected as its first president Wayland Shook, TWA flight radio operator. ACCOA will keep its headquarters at the ALPA office building, Chicago.

▶ **All-American Airways** on its third anniversary of passenger service Mar. 7 had carried 461,142 passengers 65,050,987 mi. without a fatality.

▶ **British Overseas Airways,** "because of heavy advance bookings" on trans-Atlantic coach for this summer, has increased its originally scheduled maximum services from four to six a week. . . . Has replaced Constellations with Stratocruisers on the N. Y.-Bermuda run so Comics can bolster trans-Atlantic coach service. . . . Plans to switch to jet Comet service N. Y.-Nassau and Bermuda next winter.

▶ **CAA Office of Airports** analysts Wilfred Carsel and Jesse Sternberger predict an 83% gain in U. S. airline traffic from last year to 1960. Writing in Illinois University's "Current Economic Comment," they forecast 43 million passengers for 1960 compared with 1951's 23 million.

▶ **Civil Aeronautics Board** says it will suspend the New York-San Juan coach fare of $64 Mar. 25 unless Eastern and Pan American plan to put more passenger capacity in their coach Constellations. . . . Says in its annual report that lower mail rates set last year will save Post Office $11 million this year, and mail pay recapture saved an additional $11 million last year. . . . Has denied the Eastern-National interchange application for one-plane service Florida-Texas because "Eastern had notified the Board of its desire to withdraw its application."

▶ **Council for C-46 Engineering,** a group of C-46 operators, is slated to be heard by CAB Mar. 26 in opposition to the recent "emergency safety" order cutting payload of the transport. Meanwhile, Senate Small Business Committee Chairman John Sparkman may issue a statement terming the CAB order an "economic and political" rather than a safety order.

▶ **Delta Air Lines** has DPA certificates for rapid tax amortization on 80% of the $6,390,836 of equipment applied for and certified.

▶ **International Air Transport Assn.** hearing with American Society of Travel Agents over the IATA-proposed cut of agent commission from 7½% to 6% on trans-Atlantic air coach ticket sales has been set for Apr. 15 by CAB Examiner F. M. Ruhlen. Coach runs start 15 days later.

▶ **International Civil Aviation Organization** is doubling this month's upper air weather observation in an experiment to see if benefits from improved forecasting will be worth the cost. ICAO picked March because of its high winds and quick weather changes.

▶ **Northwest Airlines** has started a new air coach service—Washington-Seattle. . . . Has told CAB it will increase seating density of its coach DC-4s to 64 passengers or more and will reduce night air coach fares to 4 cents a mile, as ordered by the Board.

▶ **Northwest-Capital Airlines** advertising and sales cooperation pending merger has been stopped by a CAB cease and desist order. Indications are the lines won't appeal the order. CAB says approval of their "help-each-other" agreement would pre-judge the Board's decision of the case and would be in restraint of trade.

▶ **Oakland Board of Port Commissioners** says the Alameda City Council has "disclaimed responsibility and refused cooperation" in conferences aimed to reduce hazards around Oakland airport. The town officials said they were "in no position to require the owners of property within the affected area to refrain from the proper use of their property."

▶ **Sabena Belgian Airlines** traffic increased one-third in 1951—to 260,674 passengers carried, with revenues over $20 million.

▶ **Trans World Airlines** traffic increased 30% over a year ago February. Domestic passenger miles were up 34% at 110,214,498; international traffic was up 7% to 19,765,112.

▶ **United Air Lines** passenger miles gained 30% over a year ago to 146,140,000 revenue passenger miles in Feb. It was down 7% from this January.

SEARCHLIGHT SECTION
(Classified Advertising)
EMPLOYMENT — BUSINESS EQUIPMENT — USED OR RESALE
OPPORTUNITIES

FLIGHT CREW FOR EXECUTIVES
Dependable, Safe, Experienced
EXCELLENT REFERENCES
Have had your's affiliation with C.A.A.
LONG ASSOCIATED AS A TEAM IN HIGHLY RESPONSIBLE POSITION
PW-3402, Aviation Week
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

CO-PILOT MECHANIC: West Coast Corporation desires A & E with Commercial Pilot's Certificate—2000 hours flight time. DC-3 Mechanical and flying experience required. Excellent opportunity for right man. Write full details to P-3649, Aviation Week.

CORNELL AERONAUTICAL Laboratory has positions available for aeronautical engineers in the fields of high speed aerodynamics, structures, aero-elasticity, control and stability, wind tunnel "project engineering", and others. Write for more information to Dept. AW, P.O. Box 235, Buffalo 21, New York.

POSITIONS WANTED

AS EXECUTIVE Pilot 4,700 hours ATR 6½ years Airline. D. H. Dubois, 2894 Poplar Street, Denver 7, Colorado.

EXPERIENCED PILOT: Commercial, all ratings, 1500 accident free hours, college, and sales experience. Age 27. Desire position as Corp. pilot. PW-3669, Aviation Week.

FOR SALE

Beechcraft D-18S—Fully equipped with deicers, anti-icers, ARC-VHF radio, 80 gallon nose tank, 3 chairs and one 3-place couch. Engines R-985/AN-14B, having 250 and 400 hours S.O.H. Spare zero time S.O.H. AN-14B engine included. Excellent condition, ready immediate operation. Asking price $37,000. Call or write William C. Wold Associates, 516 Fifth Ave., New York 36, N. Y.

Douglas C-47 Airliner, serial 6208, 6685 T.T., 1180 SOH, P & W R-1830-92, Zero & 291 SOH, 22 non-reclining seats, 24 volt, excellent condition. American Aircraft Corp., HA 8-0279, Teterboro, N. J.

Executive Beechcraft D-18-S Hydromatics-Deicers-Wipers-Soundproofed Nose Tank-Oxygen-Complete ARC Radio including Omni-ILS, etc. Corporation owned—Excellent condition. Will consider late Bonanza in trade. Pacific Aircraft Sales Co., Oakland Airport, Calif. Phone TRinidad 2-5731.

Lodestar Airline Interior, serial 2661, 1304 TT, Zero SOH, Wright R-1820-87 4 & 66 SOH, 24 volt, no corrosion, inspection at Teterboro, New Jersey. American Aircraft Corp., HA 8-0279, Teterboro, N. J.

Lodestar Airline Interior, serial 2445, 2465 T.T., Zero SOH, Wright R-1820-87, 52 & 52 SOH, 24 volt, no corrosion, inspection at Teterboro, New Jersey. American Aircraft Corp., HA-8-0279, Teterboro, N. J.

New P&W R-985-14B Engine. This is a new engine, having run-in time only. Factory records available with engine. Call or wire Mr. Dow, Airwork, Inc., Millville, New Jersey.

PBY-5A, $18,500.00, 1050 hrs.
on airframe, low time—92 engine. Fabric flyable. Plane never used in water, unlicensed but ready to go. Other PBY aircraft both licensed and unlicensed. Info furn on request. International Aircraft Sales, Rm 232 Admin Bldg, Municipal Airport, Long Beach, Calif. Ph: La. H. 409616.

UNUSUAL OPPORTUNITIES
can be found each week in the
SEARCHLIGHT SECTION

Engineers..

it PAYS YOU to figure all advantages.

SELECT
YOUR AVIATION CAREER
CAREFULLY!

BEECH AIRCRAFT CORPORATION

has openings for:

DESIGN ENGINEERS
ELECTRICAL ENGINEERS
MECHANICAL ENGINEERS
STRUCTURES ENGINEERS
AERODYNAMICS ENGINEERS
TOOL ENGINEERS

HERE ARE THE ADVANTAGES:

Working Advantages

Top pay rates. Five and one-half day week. Liberal vacation policy and sick leave. Excellent opportunity for advancement. Wide variety of products. Varied assignments — each engineer is an individual and can do original work. Long-range work schedule.

Living Advantages

Small-town atmosphere with city advantages. Unsurpassed school system — kindergarten through university. Top-ranking university school of aeronautics offers night classes for professional advancement or completion of engineering degree. Varied but not extreme climate. Many facilities for recreation and entertainment. Live within a 20-minute drive of work.

SEND THIS COUPON NOW! OR MAKE APPLICATION GIVING FULL RESUME OF YOUR QUALIFICATIONS

Personnel Department
BEECH AIRCRAFT CORPORATION
9709 EAST CENTRAL, WICHITA, KANSAS

PLEASE SEND ME COMPLETE INFORMATION AND BEECHCRAFT APPLICATION FORM.

NAME _____

ADDRESS _____

CITY _____

OCCUPATION _____

I AM INTERESTED IN THE FOLLOWING ENGINEERING POSITION:

AC SPARK PLUG DIVISION
of
GENERAL MOTORS CORPORATION

PRECISION INSTRUMENT PLANT

Positions now available for highest caliber personnel in the field of airborne automatic, electro-mechanical control equipment.

MECHANICAL DESIGN ENGINEERS
ELECTRONIC ENGINEERS
SERVO ENGINEERS
ELECTRONIC DESIGNERS
MECHANICAL DESIGNERS

New and expanding division of an established firm with 20 years of successful experience in the instrument field. Work involved deals with the manufacture and development of highly complex equipment of the most advanced type.

Write or Apply

AC Spark Plug Division

GENERAL MOTORS CORPORATION

1925 E. Kenilworth Place
Milwaukee 2, Wisconsin

Rockets

Missiles

Flying Boats

Advanced Military Aircraft

Commercial Airplanes

Guidance Systems

VARIETY
SPICES THE LIFE OF
ENGINEERS
WORKING WITH
Martin

Needed Now!

Structures Engineers

Openings in all classifications — wide variety of progressive projects.

Aerodynamics Engineers

Two to six years' experience. Aerodynamic testing, design and development.

●

Martin has the greatest diversity of projects of any aircraft company in the East. Offers greater opportunities for development, career positions for qualified engineers. Submit strictly confidential resume outlining qualifications in detail. Personal interviews arranged.

THE GLENN L. MARTIN CO.
Personnel Dept. • Baltimore 3, Md.

BE A UNITED PILOT

Applications Now Being Accepted For Next Training Class

Have a career in commercial aviation with one of the nation's leading airlines. Pay is excellent, and there are ample opportunities for advancement. Retirement-Income Plan, broad Insurance Program and many more benefits.

QUALIFICATIONS:

Age: 21 to 30
Height: 5'6" to 6'3"
Vision: 20/20 without correction
Education: High School graduate
Citizenship: Must be U.S. citizen
Flying Experience: Must have valid CAA commercial license*

*Fliers who are within two months of securing their commercial license, and who are otherwise qualified, can apply now, too. Consideration will be given, subject to their obtaining their commercial license.

Apply now to:

UNITED AIR LINES
Write C. M. Urbach, Dept. AW
United Air Lines Operating Base
Stapleton Field, Denver 7, Colorado

DEVELOPMENT ENGINEER

AVIATION ENGINE AND FLIGHT TYPE INSTRUMENTS

Staff position open to well qualified engineer for development of electro-mechanically operated aircraft instruments. Engineering degree plus experience in this field a prerequisite.

Fine opportunity to grow with a young, progressive organization, directed by an alert engineering management and ownership.

Send complete resume to: Personnel Manager

Avien
34-56 58th St. Woodside, N. Y.

RECENT ENGINEERING GRADS

Are You Interested In Getting An Advanced Degree?

If you want to combine work and study, and at the same time gain experience in research techniques, full time employment opportunities are available in aerodynamic research projects utilizing wind tunnel facilities. Any type of engineering training acceptable. Submit details of background to Mr. F. K. Womack:

University of Minnesota
Aeronautical Engineering Lab
Rosemont Research Center, Rosemont, Minnesota

ENGINEERS

GOODYEAR AIRCRAFT

Goodyear Aircraft Corporation, one of the oldest aircraft development organizations in the field, now offers unusual opportunities to engineers, both experienced and recent graduates, in all branches of aircraft design and development.

In addition to manufacturing airplanes and airships, Goodyear Aircraft builds a number of vital aircraft components as well as guided missiles, radar and other material for the defense program. The diversification of products, beyond purely defense needs, at Goodyear Aircraft, has resulted in an unusually stable and progressive organization throughout post war years.

Salaried positions with accompanying liberal employee benefits and bonus for extended work week are open to

AERONAUTICAL ELECTRICAL
MECHANICAL ELECTRONICS
CIVIL INDUSTRIAL

ENGINEERS
for
DESIGN AND DEVELOPMENT
of

AIR FRAME STRUCTURE
LANDING GEAR AND HYDRAULICS
EQUIPMENT AND POWER PLANT INSTALLATIONS
ELECTRONIC AND ELECTRICAL SYSTEMS
WHEELS and BRAKES
MECHANICAL COMPONENTS

Personnel are needed in the following classifications:

DESIGNERS DRAFTSMEN
PHYSICISTS MATHEMATICIANS
DEVELOPMENT ENGINEERS TOOL ENGINEERS
STRESS AND WEIGHT ANALYSTS

Previous experience and formal education desirable. However, applicants without formal education but with equivalent practical experience in other engineering fields will be given consideration.

You are invited to investigate these opportunities by submitting a resume of your qualifications and experience or by simply sending for an application either of which will be given prompt and serious consideration.

Address all correspondence to
Mr. C. G. Jones, Salary Personnel Department

GOODYEAR AIRCRAFT CORPORATION
AKRON 15, OHIO

EXECUTIVE ADMINISTRATIVE ENGINEER

Midwest aircraft manufacturer has desirable opening for qualified executive to administer, plan, estimate and coordinate projects in engineering division. This opening is the result of internal advancement.

Must have previous experience in this field. Salary is open. This opportunity is with a well-established prime contractor and offers continued advancement. All replies will be treated in strictest confidence. Send detailed resume and recent snapshot to

P-3532, Aviation Week
520 N. Michigan Ave., Chicago 11, Ill.

MECHANICS
WANTED

Sheet Metal Men and Aircraft Mechanics needed immediately.
Contact Superintendent of Maintenance or Personnel Director.

ROBINSON AIRLINES
ITHACA, NEW YORK

RESEARCH INSTRUMENTATION

For compressors, turbines, burners, accessories, rocket engines, wind tunnels, test stands, metallurgy etc. Good deliveries on thermocouples, pitot static probes and rakes, directional probes, total temperature probes and water cooled rakes. For high or low temperatures & mach. no's. Contractors to N.A.C.A.

RESEARCH INSTRUMENTS CO.
12410 Triskett Rd. Cleveland 11, Ohio
Phone Orchard 1-3414.

CHIEF ENGINEER

Age between 25 and 35. Must have solid record recent achievements with at least full project responsibility with major airframe and/or helicopter company. Salary up to $20,000 plus opportunity to secure important stock interest in a new, but well established, company in the southwest having 500 employees now engaged in several interesting development and manufacturing programs for Navy and Air Force. Company is also active in foreign projects.

Applications should give full details, experience and earning record and will be kept strictly confidential.

P-3685, Aviation Week
330 W. 42 St., New York 36, N. Y.

COMPLETE HELICOPTER SERVICE

FOR THE FORWARD-LOOKING YOUNG MAN,
we offer training for a real money-making job in helicopter piloting and maintenance.

FOR THE PROGRESSIVE FIRM,
we have reliable equipment with experienced crews available for lease anywhere.

NEW ENGLAND HELICOPTER SERVICE, Inc.
STATE AIRPORT . . DEPT. A
HILLSGROVE, R. I.

World's oldest helicopter operator

NEW SURPLUS WRIGHT ENGINE PARTS

Stock Up Now Before Supply Is Exhausted

68498 Ring, V1, 15, 17, 19, V2, 20, 21, 22, V3, V4, V5, V7, V8, $1.05—50%.	114041, V1, V15, V17, V18, V19, V20, V4, $1.45—50%.
114820 Ring	$1.10—50%
412554 Housing	$87.30—50%
111418 Cam	$172.80—50%
111372 Cam	$172.80—50%
69794 Shaft	$139.96—50%
418397 Crankcase Stdg. Assy.	$258.75—50%

All in Original Packing with Preservative

JOHN B. RUDY COMPANY
1023 South Flower Street Burbank, California
Phone ROckwell 9-2393

HANGARS
FOR SALE

All Steel packaged for shipment complete.
2 sizes: 194' x 200'—148' x 162'
Immediate Delivery—We erect anywhere

ANDERSON AIRCRAFT CORPORATION
1700 Sawtelle Blvd., Los Angeles 25, California
Bradshaw 2-1242 Arizona 3-2681

PRODUCTION MANAGER WANTED

Industrial & Electrical Products—Company has top reputation and 400 employees—Present Manager moving up—Cooperative associates — Interesting future — Excellent compensation arrangements—Please give full data including requirements and enclose recent photo.

Several positions also available for graduate engineers.

M. G. CHAMBERLAIN & COMPANY
Industrial Consultants
8845 W. Olympic Blvd. Beverly Hills, Calif.

WANTED - - AT-6 PARTS
Harvard, SNJ or NAA Trainer Parts of Every Nature:

Landing Gear & Landing Gear Assys; Propeller Assys; 2PR-400 BRD Fuel Pumps; AN-5525-1 & 2 Temperature Bulbs; AN5530-1 Tachometers; AN5531-2 Tachometer Generators; G-2-87 Goodrich Brake Assys; 3P207-JA Pumps; 9136-C25 Pressure Switches; 3V215-8 Pesco Suction Relief Valves; 3S647 Pesco Oil Separators.
INSTRUMENTS: AN5730-2A(2B)(6A) & AN-5730-3 Compasses; AN5735-1 Type A-5 Gyro Direct. Indicators; AN5736-1 Type C-7 Gyro Horiz. Indicators; AN5743-1A Elgin Clocks; AN5860-2 Air Speed Indicators; AN-5766-T3 Magnetic Standby Compasses; AN-5770-1 Manifold Pressure Gauges; AN5711-T4B Hyd. Press. Gauges; AN5771-5 Suction Gauges; AN5773-1 Engine Gauge Units; AN5790-6 (1100-77A) Indicators; AN5820-1 Turn & Bank Indicators; AN5822-1 Air Filters (Skinner 27300); AN5825-T6 Rate of Climb Indicators; AN5760-4B Pressure Altimeter.
ALSO: Surfaces and Airframe Parts.

HAMILTON STANDARD PARTS
Propeller Governors Nos. 1M12G and 1A2-G5; AT-6 Blades No. 6101-A12; AT-6 Hubs No. 12D40. NEW PRATT & WHITNEY R-1340 WASP ENGINES AND MISC. PRATT & WHITNEY PARTS.

—Will Pay Top Dollar—
New or Overhauled & Certified Material OK
Phone, wire, or write immediately!!!

COLLINS ENGINEERING CO.
9050 Washington Blvd. TExas C-4811
Culver City, California

LOCKHEED LODESTAR N 60000

Late serial (2537)—just converted to plush executive Lodestar—Indirect lighting in cabin—special plush lavatory—six chairs — divan — desk — hot cup — folding tables—dual fuel system—complete VHF and Omni—recent airframe overhaul—new zero time engines—one of the very cleanest planes of its type.

PAGE AIRWAYS, INC.
Rochester Airport Rochester, N. Y.

AVIATION

Flying Tigers
NEED
CO-PILOTS

2500 hrs flying time
ATR preferred. Age to 35

Contact Personnel Dept.

FLYING TIGER LINE
LOCKHEED AIR TERMINAL
nr end of Sherman Way
Burbank, California

FOR SALE OR LEASE

3 CURTISS C-46 AIRCRAFT
2 DOUGLAS C-47 AIRCRAFT

AVAILABLE FOR IMMEDIATE INSPECTION AT MIAMI, FLORIDA

AAXICO
AMERICAN AIR EXPORT & IMPORT COMPANY

P. O. Box 875 Miami 48, Florida

FUTURE HELICOPTER PASSENGER PROGRAM HAS OPENINGS FOR

Helicopter Pilots, Mechanics,
General Operations,
Maintenance and Traffic Personnel.

Address reply direct to:

LOS ANGELES AIRWAYS, INC.
Box 10155 Airport Station, Los Angeles 45, Calif.

WANTED
CURTISS PROPELLER BEARINGS

104075 Bearing Assembly (5 in Stack) New Departure 5 P26-4-OP26 or MRC 4 7026-7CC—1 7026-9CC

Advise Quantity, Condition and Price.
Also Interested in C5436 and C5428 Propellers, Blades and Parts

W-3671, Aviation Week
330 W. 42nd St., New York 36, N. Y.

Collins 51R VHF Receivers
With or Without Omni
Also
Collins 17LZ VHF Transmitters
And 17K1 VHF Transmitters
NOW IN STOCK

NAVCO, INC. Lambert Field, St. Louis, Mo.

AIRCRAFT SPARES

For DC3/C47 Dakota, C54 Skymaster, L5 Stinson, AT6 Harvard: Airframe, Engines, Propeller, Accessories and Instruments. Ready Stocks for Export Overseas.

Largest Quantities Available in the World

HINDUSTAN AIRCRAFT LTD.
BANGALORE, INDIA
Telegrams: "AIRCRAFT"

LOCKHEED LODESTAR
EXECUTIVE TRANSPORT

Blue gray interior. Seven chairs. Four-place Divan.

Model 18-56, N-1000-F (Standard) Serial #2463. Mfg. 1943, 2156 air-frame hrs.

EXTRA EQUIPMENT

Custom-built, dual instrument panel. Anti-icing and de-icing wing, props, carburetor. Oxygen system. Complete for all-weather flying.

RADIO EQUIPMENT

Dual Radio Compass. TV-10 channel trans. RA-1B LF receiver. ARC-R-15 VHF receiver. ARC-15-B VHF omni receiver. Collins 17K-1 VHF trans. Three-light marker receiver. ILS BC-733D localizer R89 glide path (flag alarm). ARC-F11 isolation amplifier.

Call, write, phone
Mr. A. B. Berkstresser — Ashland 1860
ASHLAND OIL & REFINING COMPANY
ASHLAND, KENTUCKY

ENGINEERS

Special opportunities for YOU in

SAN DIEGO

that smog-free coastal city in

CALIFORNIA

Convair (Consolidated Vultee Aircraft Corporation) is now accepting applications for the following positions in its modern, progressive Engineering Department:

Design Engineers	Servo Engineers
Design Draftsmen	Test Engineers
Electrical Draftsmen	Weight Engineers
Electronics Engineers	Aerodynamics Engineers
Microwave Engineers	Thermodynamics Engineers

WORKING FACTS: You get two holidays a week at Convair—overtime accomplished in 5-day week. Attractive salary ranges. An "engineers" engineering department . . . with stimulating, competent associates . . . and interesting, challenging, essential, long-range projects of a wide variety including—commercial aircraft, military aircraft, missiles, engineering research and electronic development. Excellent patent royalty arrangements. Top-notch retirement plan—better-than-average life and health insurance. Complete progress-salary review for each person twice yearly. Opportunity for continuing engineering education.

LIVING FACTS: San Diego, with its wonderful residential areas, offers you and your family incomparable living. Ideal climate—cool, clean, dry. Mountains, desert, Mexico, Hollywood, Los Angeles, Pacific Ocean, beaches and bay—only hours or minutes away. It offers you a new way of Life . . . pleasant, refreshing, happy.

If you qualify, you will receive generous travel allowances. *SEND COUPON NOW* for free booklets giving complete information.

THANK YOU

Mr. H. T. Brooks, *Engineering Department 200*
Convair, 3302 Pacific Hiway, San Diego, California

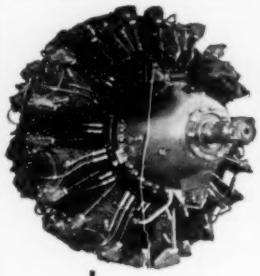
Please send me ***FREE*** booklets describing the Convair Opportunity for me and my Convair Application Form.

My name_____

Address_____

City_____ State_____

Occupation_____



R-2800's 31's-51's-75's

price $3000.00

These engines are 00:00 time since C.A.A. approved overhaul and have had ACES C.A.A. approved outside in lubrication system blower to thrust plates incorporated. They have also been block tested in our modern test cells and have been prepared for long term storage.

Exchange Price on Above $2,600.00

C.A.A. APPROVED OVERHAULS

- R 1340-AN-1 exchange only $2,500.00
- R-1830-92 without exchange $2,700.00

Above with exchange $2,300.00

ALL WORK AND ENGINE SALES CARRY OUR 100 hr. WARRANTY

AIR CARRIER ENGINE SERVICE Inc.

C.A.A. Approved Repair Station No. 3604 — Intl. Airport Branch, P. O. Box 236, Miami 48, Florida
Cable "ACENGSER"

ACES AIR CARRIER ENGINE SERVICE, INC.

INSTRUMENTS

Authorized Factory Sales and Service for

* Eclipse—Pioneer
* Kollsman
* U. S. Gauge

C.A.A. Approved Repair Station #3564

Contractors to U. S. Air Force

Our stock of instruments is one of the *largest in the East.*

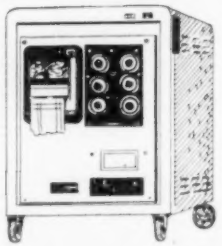
IMMEDIATE DELIVERY

CALL • WIRE • WRITE

INSTRUMENT ASSOCIATES

363 Great Neck Road, Great Neck, N. Y.
Telephone: Great Neck 4-1147
Telegraph: WUX Great Neck, N. Y.

WESTINGHOUSE IGNITION WELDING TIMERS



Spot and Seam Welding Sequence with Dual Heat and Time Control Type SP-9C

FOR 220 - 440 - 550 VOLT 60 CYCLE SERVICE

COMPLETE WITH IGNITRON TUBE CONTACTOR WITH SEQUENCE PANEL AND GENERAL ELECTRIC AMPERE SQUARED SECOND RECORDER for measuring and recording on tape variation in the current and time during spot weld. Cat. 801-4439-G1 0.5 Ampere Squared Seconds = 100% approximate Amperes 5/1.

- Used for Spot and Seam Welding.
- For precision synchronous control in resistance welding.
- Controls time and current.
- Indispensable for welding stainless steel.

Costs Government Over $1,600.00 each.

$250.00
As is each
LESS TUBES
F. O. B.
Phila., Pa.

LURIA BROTHERS & COMPANY, INC.

Lincoln Liberty Building — Philadelphia 5, Penna.
TELEPHONE: Rittenhouse 6-7455 Att. Arnold Landesberg

EXECUTIVE AIRCRAFT

LOCKHEED PV-1—Heavy Gear. 400 hrs. Since New. Ready for Immediate Flyaway. Engines Overhauled by P & W Factory. Can be Inspected at National Airport, Wash., D. C.

DOUGLAS C-47—Cargo and Airline Version Available.

LOCKHEED LODESTAR — Powered by P & W 1830-92 Engines. Original Conversion by Lockheed Factory. Ready for New Interior of Your Choice. Now Licensed.

BOEING B17G—Executive Four Engine Transport. Ready to Go Anywhere in the World. This Aircraft Mfg. Late 1945. 235 M.P.H. Cruising Speed.

BEECHCRAFT D-18S.

WE ARE PRINCIPALS

LEEWARD AERONAUTICAL

1104 C. OF C. BLDG. Miami, Fla. Tel: 9-1218 — P. O. Box 210 Fort Wayne, Ind. Tel: Harrison 2145

1—DOUGLAS DC-3
(Now receiving complete overhaul prior to modification. Can finish to customer's specifications.)
1—EXECUTIVE LOCKHEED LODESTAR
(Now receiving complete overhaul prior to modification. Can finish to customer's specifications.)

For details:

STONNELL & HOLLADAY
National Airport Washington, D. C.
Phone STerling 5753

PRATT & WHITNEY ENGINES

R2000-7

Engine time 00:00 since CAA approved overhaul

Priced while they last

$9500.
each

CALIFORNIA EASTERN AIRWAYS, INC
11 W. 42nd Street, New York, N. Y.
Phone PEnnsylvania 6-8770

600 AMP

Reverse Current Relay AN3025-2 Hartman A702A New sealed cartons, pack expiration date 4-17-53.

Just one of many "hot" instrument and electrical equipment items in stock for immediate delivery—Others are:
AY203 & AY205 Autosyn Motors
AN5745-2 Accelerometers
Type E-21A Jet Tach (0-110%)
AN5773-1 Engine Gage
B9 & B11 Cyl. Hd. Temp Gages
AN3201 and AN3202 Ammeter & Voltmeter
Thousands of others . . . Government Source inspection or CAA inspection as desired.

R. E. WHITE & ASSOCIATES
6919 San Fernando Rd.
Rockwell 91191 Glendale, Calif.

New Sparkplugs

C34S & C35S
.40 ea.

L & H Supply Inc.
8202 Cedar Springs Dallas 9, Texas

FOR SALE:
Quantity of
Model SGV-770C-11
FAIRCHILD AIRCRAFT ENGINES
12 Cylinder—Inverted Vee-Type-Air Cooled —Geared Drive.

FS-3510, Aviation Week
330 W. 42 St., New York 36, N. Y.

IMPORTANT! ***Many items in this group have not been listed in previous ads!***

One of America's largest stocks of UNUSED

AIRCRAFT PARTS

We own and offer all parts listed — plus many thousands more — stocked in our Baltimore warehouse!

CARBURETORS! MAGNETOS! SPARK PLUGS!

Quantity	Part No.	Description
247	PD12K10	Stromberg injection carburetor
19	1375F	Holley carburetor
407	SF9LN-2 (manufacturer's part No. 10-12453-6 Spec AN9511)	Bendix Scintilla Magneto
42	SF5RN-12 (manufacturer's part No. 10-26170-1)	Bendix Scintilla Magneto
185,000	LS4AD1	Spark Plug (Aero)
30,000	LS-659A	Bendix Scintilla Spark Plug

SPECIAL GROUP!

Ideal for tear-down for parts

Quantity	Part No.	Description
328	PD12K10	Stromberg injection carburetor
236	PR48-A1	Stromberg carburetor
29	PR48-A2	Stromberg carburetor
31	PR48-A3	Stromberg carburetor

PRATT AND WHITNEY AIRCRAFT ENGINE PARTS

Quantity	Part No.	Description
166	1045A	Bearing
500	3506	Flange
130	9288	Follower Ass'y
814	35814	Blower Ass'y
53	48362	Shaft
175	48363	Shaft
56	48398	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	84591C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

HUGE STOCKS OF ALL TYPES *AN* HARDWARE NEW — UNUSED. WRITE FOR DETAILED LISTINGS.

BEARINGS AIRCRAFT

Quantity	Part No.
18000	K3L-2
8600	K3L-R48
4000	KF4
3000	KF4H
30000	KP4R16-2
3300	KSF5
17000	BC5W11
28000	KS6A
7000	38KD4
6600	RE3MR3
5000	F35-14

ACTUATORS

Quantity	Part No.
42	400AJ3
161	420 EC
160	420 DY
12	M-2031 (Air Associates)

EXTRA SPECIAL!

30,000 BOLTS AN8-87 ½" dia—8-31/32" long

Priced 'way below market! Can be used as is or for cut-down purposes.

★
26,000 AN10-17 5/8" dia—2-9/64" long
4,800 AN12-26 3/4" dia—2-29/32" long
1,795 AN16-61 1" dia—6 3/8" long

MISCELLANEOUS COMPONENTS

Quantity	Part No.	Mfg.	Description
45	AN4103-2	Clifford	Brass (Valve #U4785) Oil Cooler
38	18597-2	Airesearch	Aluminum Oil Cooler
120	MF9-713-15A	Vickers	Hydraulic Pump
160	2E499E	Pesco	Fuel Pump
700	TFD 8600	Thompson	Fuel Booster Pump
125	D7818	Adel	Anti-icer Pump
50	2P771-A	Pesco	Fuel Booster Pump
250	AN4014	Erie Meter	Wobble (D-3) Pump
300	1H960-K & KA	Pesco	Hydraulic Pump
19	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
16	76B19	Lewis Eng.	Cyl. Head Temp. Gauge
10	46B2	Lewis Eng.	Air Temp. Ind.
31	47B21	Lewis Eng.	Temperature Ind.
19	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	76B4	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
85	727TY79Z2	Weston	Left Wing Anti-icing
89	727TY73Z2	Weston	Right Wing Anti-icing
83	727TY74Z2	Weston	Tail Anti-icing
11	2227-11D-3A	Eclipse	Dual Tachometer
44	5BA25DJ48	G. E.	DC Motor (½ HP)
83	A4934	Delco	Motor
50	RD82220	Holtzer Cabot	DC Motor
49	FD65-5	Diehl	Motor
47	FD65-6	Diehl	Motor
116	A371905	Dumore	Motor
780	A371906	Dumore	Motor
115	P4CA2A	Parker	Primer
70	AN3213-1	Scintilla	Ignition Switch
450	A-9 (94-32226)	Nasco	Ignition Switch
687	RS-2	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
498	S-841 (94-32253)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
1000	13018-A	Bendix	Interphone Box
140	K14949E	Marquette	Windshield Wiper Kit
188	E9LC-9334	Berber-Colman	Control
11	18086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	538-1A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
37	117-47	Edison	Detector
89	318	Edwards	Horn
90	794-F	Stewart-Warner	Heater
280	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	923748	Kidde	Oxygen Cylinder
80	DW28	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
148	PG908AS1	Minn. Honeywell	Air Ramp Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
750	ND21	American Gas Accumulator Co.	Time Delay Relay
30	U6005-DV5	United Air Prod.	Oil Temp. Reg. 5°
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6°
95	UA-3160C	United Air Prod.	Oil Temp. Reg. 6°
73	UA-6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7°
14	UA6009-5-30	United Air Prod.	Oil Temp. Reg. 9°
11	UA-6012K—S30K	United Air Prod.	Oil Temp. Reg. 19°

★ ***Send us your material lists for screening!***

WRITE—WIRE—PHONE

COMMERCIAL SURPLUS SALES CO.

4101 CURTIS AVENUE, BALTIMORE 26, MARYLAND

TELEPHONE: CURTIS 3300

EDITORIAL

How Some Business Men View CAA's Air Safety Office

(These letters from company executives, from different firms, tell their own stories of experience with CAA's deteriorating Office of Aviation Safety. These are unedited opinions of today's conditions in the Civil Aeronautics Administration's Safety Enforcement division. We are not publishing the writers' names; recrimination would follow in short order, from Ernest Hensley, OAS director, his deputy, William Davis, and their henchmen. Experienced men —especially in engineering—and men of integrity and safety experience—are being replaced in too many posts by men of lesser qualifications. We are still receiving mail from CAA people and aviation executives, and invite further comments.—R. H. W.)

From CAA's Second Region

It is my impression . . . that you, like most of us in the industry, are taking a rather dim view of the reorganization now taking place within CAA. . . . That power-grabbing internal politics have seriously affected the efficiency of CAA in recent years is indisputable; however, the latest maneuver designed to almost completely neutralize the Aircraft Division appears to be the crowning blow and could even be a contributing factor to the recent wave of accidents.

As you know, practically all of the technical know-how in CAA has been contained in the Aircraft Division. The background requirements for this group were much stricter than for most of the other divisions and there existed within the Aircraft Division a strong nucleus of experienced engineers.

It was my experience in dealing with the various regional Aircraft Division offices that obtaining an approval for a modification, a new installation, or a change in a type certificate wasn't always easy, but I was always certain that any resistance was based on purely technical grounds and that everyone else would get the same treatment.

The reorganization appears to have done two things:

- Interjected at least two persons between the Regional Administrator and the Chief of the Aircraft Division; apparently no technical background is required for either of these men.
- Driven the competent engineers out of the CAA.

ENGINEERS OVERRULED

Looking at the above, I believe we all will agree that a Safety Division is a good thing; however, it appears that now, and I speak from experience, approvals are given for very technical changes by Safety Agents who have absolutely no background for technical evaluations. There are actual cases where an engineer in the Aircraft Division has refused an approval only to have a Safety Agent, not an engineer, grant it regardless. As for the second point, it is interesting to note that the Aircraft Division in the Second Region has been whittled from 22 to 12 positions, including clerical help, while the other offices have in many cases actually increased their complement.

Also, it is my understanding that the entire Aircraft Division of the Third Region consists of three men plus clerical help; this is the office responsible for the C-46 (tests).

In addition to the confusion that now exists in the Regional Offices—and it is considerable—there is the ever-growing bureaucratic regulation by the Washington offices. It is no longer possible to discuss a matter with this group on strictly technical grounds.

It was my impression that the CAA was constituted as a nonpolitical group whose purpose was to foster civil aviation.

The present Washington group, farther and farther removed from actual operation (I'll wager some don't enter an airplane from year to year or even visit a ground facility) have grown completely arbitrary in their approach.

ARBITRARY APPROACH

I can cite specifically their handling of the C-46. Two years ago, in early 1950, an operator wanted to purchase several C-46s but wanted them certificated under transport category rules. A program was outlined whereby Pratt & Whitney CB series engines would be installed, the nacelle would be modified to incorporate the latest fire detector and extinguishing systems, and generally, the airplane would be brought at least to the standards of the DC-4 and the early Constellation series.

Since the C-46 had been designed well before 4b came into existence, it would have been necessary to obtain waivers of minor sections of 4b (all of which had previously been waived for other transport aircraft).

The Second Region Aircraft Division office, looking to the increased safety margins that the modifications would provide, agreed that the program, including the proposed waivers, was well within the regulations and recommended approval. It was quite a surprise, therefore, when Washington turned it down, stating that the airplane would have to meet Part 4b in its entirety.

ONLY A TAXPAYER

Since this seemed discriminatory we visited Washington. There we weren't even given the courtesy of a talk with Mr. Haldeman, but instead were extended the privilege of a few moments with Mr. Omer Welling, who told us, in effect, that they had made a decision and that I, as a taxpayer, was not entitled to an explanation, and what did I propose to do about it?

Imagine my surprise when a year and a half later CAA decided (Washington again) that they would conduct "accurate" flight tests on the C-46. Of course, Miami was chosen, it being winter, for this test to end all tests. The results you know—it was shown in public hearing that these tests were completely inconclusive and a waste of taxpayers' money. It has been apparent that Washington CAA men have been embarrassed by their mishandling of the C-46 from the beginning and are making a concerted effort to write the airplane off (and with it most of the nonscheduled airlines, another pet ATA project).

This is only one small example of the tendency of the Washington group toward complete dictatorship. . . . There are others I could cite. I will gamble, however, that figures will show . . . an increasing proportion of CAA personnel in Washington over those in the field, this happening at a time when there is a critical shortage of qualified men in the field and an increasing accident rate.

In addition, we have, even in the Regional Offices, an increasing number of instances wherein CAA personnel have utilized their positions for personal gain. I need go no farther than the Feb. 12 article in the New York Journal-American (on liquor dealing by CAA personnel).

All in all, there are those of us who feel now is the time to remove politics from CAA. . . . I hope you will continue to take an active interest in the problem and will feel free to contact me at any time you desire additional information.

An Official of a Leading Aviation Firm in the Southeast

Another Second Region Letter

In answer to your telegram I am forwarding some information in hopes it will help you in exposing the true picture of the CAA reorganization. . . . The investments of our stockholders and myself, my work and my livelihood are in the aviation industry. Consequently, we are vitally concerned with any agency that controls, governs or affects our business. . . .

We believe that the recent series of aircraft accidents involving the death of a great number of passengers is naturally the concern of not only those associated with the industry, but of every citizen. . . .

LAZY & DECADENT

We believe that the organization responsible for safety in all phases of aviation should be free of political influence either inside or outside the organization. It is quite apparent, and we believe that investigation will prove this statement, that the organization has become lazy, decadent and governed by internal political maneuvering, that the most qualified personnel seldom, if ever, are placed in policy-making positions and generally speaking, that the entire organization is headed by incompetent and inexperienced personnel.

The recent reorganization of the Safety Division seems to have further aggravated the situation in that it has placed addi-

(Continued on page 94)

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—MARCH 24, 1952

ADAMS-RITE MFG. COMPANY 60
Agency—The Shaw Company

ADEL DIV., GENERAL METALS CORP 50
Agency—The McCarty Company

AIRBORNE ACCESSORIES CORP 7
Agency—Gray & Rogers Adv.

AIRCRAFT-MARINE PRODUCTS, INC 72
Agency—Benner Advertisers

AIRTEMP, DIV. CHRYSLER CORP 23
Agency—Grant Advertising, Inc.

ALLEN AIRCRAFT PRODUCTS, INC 83
Agency—The Fred Bock Adv. Co.

AMERICAN CHAIN & CABLE 73
Agency—Reincke, Meyer & Finn, Inc.

AMERICAN ELECTRIC MOTORS CO 32
Agency—Clyde D. Graham Adv.

AMERICAN PHENOLIC CORP 58
Agency—Burton Browne Adv.

AUBURN SPARK PLUG CO., INC 4
Agency—Richards & Webb, Inc.

AVCO MANUFACTURING CORP 24
Agency—Benton & Bowles, Inc.

BELL AIRCRAFT CORP 35
Agency—Comstock & Company

BRISTOL COMPANY, THE 31
Agency—James Thomas Chirurg Co.

BROOKS & PERKINS, INCORPORATED 69
Agency—Holden-Clifford-Flint, Inc.

C & H SUPPLY CO. METAL-CALS DIV 36
Agency—Wallace Mackay Co.

CANNON ELECTRIC DEVELOPMENT CO 44
Agency—Hixson & Jorgensen, Inc.

CHASE AIRCRAFT CO., INC 8
Agency—Charles Blum Adv. Corp.

CHRYSLER CORPORATION 41
Agency—Zimmer, Keller & Calvert, Inc.

CLARY MULTIPLIER CORP 51
Agency—Batten, Barton, Durstine & Osborn, Inc.

CLEVELAND PNEUMATIC TOOL CO., THE 34
Agency—The Bayless-Kerr Co.

CONSOLIDATED VULTEE AIRCRAFT CORP 42
Agency—Buchanan & Co., Inc.

DANLY MACHINE SPECIALTIES, INC 70
Agency—Waldie & Briggs, Inc.

DARNELL CORPORATION, LTD 93
Agency—Rhea Advertising Service

DEAN & BENSON RESEARCH, INC 82

DESPATCH OVEN CO., THE 57
Agency—Harold C. Walker Adv.

DOW CHEMICAL CO 68
Agency—MacManus, John & Adams, Inc.

DUMONT AVIATION ASSOCIATES 77
Agency—Edward S. Kellogg Co.

EATON MANUFACTURING CO 33
Agency—Clark & Bickford, Inc.

ECLIPSE-PIONEER DIV. OF BENDIX AVIATION CORP. 37
Agency—MacManus, John & Adams, Inc.

EDO CORPORATION 83
Agency—Davis-Parsons, Inc.

ELASTIC STOP NUT CORP. OF AMERICA 25
Agency—G. M. Basford Co.

ELECTRO FILM CORP 61
Agency—The Jordan Company

EX-CELL-O CORPORATION 55
Agency—Holden-Clifford-Flint, Inc.

FAFNIR BEARING CO., THE 5
Agency—Horton-Noyes Co.

FAIRCHILD ENGINE & AIRPLANE CORPORATION ..... Third Cover
Agency—Buchanan & Co., Inc.

FENWAL, INCORPORATED 28
Agency—James Thomas Chirurg Co.

GENERAL ELECTRIC COMPANY ..... Fourth Cover
Agency—G. M. Basford Co.

GOODRICH CO., THE B. F 3
Agency—Batten, Barton, Durstine & Osborn, Inc.

GREER HYDRAULICS, INC 10
Agency—Dunwoodie Advertising Service

GRUMMAN AIRCRAFT ENGINEERING CORP. ..... Front Cover
Agency—Charles W. Hoyt Co., Inc.

GULF OIL CORPORATION 45
Agency—Young & Rubicam, Inc.

HARTWELL AVIATION SUPPLY CO 62
Agency—The McCarty Company

HOLLINGSHEAD CORP., R. M 22
Agency—Campbell-Mithun, Inc.

HOWARD INDUSTRIES, INC 31
Agency—Geistel-Lasff Adv.

HYDRO-AIRE, INC 20
Agency—John H. Riordan Co.

JACK & HEINTZ, INC 66, 67
Agency—Fuller & Smith & Ross, Inc.

JANKE & CO., INC 43

JOHNS-MANVILLE CORP 27
Agency—J. Walter Thompson Co.

KENTON EQUIPMENT LTD 84

KESTER SOLDER COMPANY 32
Agency—Paul J. Steffen Co.

LEWIS ENGINEERING CO., THE 26

LYCOMING SPENCER DIV., AVCO MFG. CO 24
Agency—Benton & Bowles, Inc.

MANNING, MAXWELL & MOORE, INC 38
Agency—Fuller & Smith & Ross, Inc.

MARQUARDT AIRCRAFT COMPANY 60
Agency—The Ivey Company

McGRAW-HILL BOOK CO., INC 51

MINNESOTA MINING & MFG. CO 54
Agency—MacManus, John & Adams, Inc.

MONADNOCK MILLS 47
Agency—H. B. Humphrey, Alley & Richards, Inc.

NORTH AMERICAN AVIATION, INC 39
Agency—Batten, Barton, Durstine & Osborn, Inc.

NORTHROP AIRCRAFT, INC 60
Agency—West-Marquis, Inc.

PIASECKI HELICOPTER CORP 59
Agency—R. K. Davis & Bro.

PIONEER TOOL ENGINEERING, INC 70
Agency—Clyde D. Graham Adv.

PRE-CAST, INC 59
Agency—Van der Boom, Hunt, McNaughton, Inc.

PROPELLER SERVICE CORP., THE 46
Agency—Charles Palm & Co.

REYNOLDS METALS COMPANY 78
Agency—Price, Robinson & Frank, Inc.

RUSSELL REINFORCED PLASTICS CORP 40
Agency—Rex Cosler Adv.

SAFE FLIGHT INSTRUMENT CORP 29
Agency—Davis-Parsons, Inc.

SEARCHLIGHT SECTION 85, 86, 87, 88, 89, 90, 91

SHAFER BEARING CORPORATION 35
Agency—Marmelzat, Gebhardt & Reed, Inc.

SIMMONDS AEROCESSORIES, INC 35
Agency—Jones & Brakeley, Inc.

SOCONY-VACUUM OIL CO 48, 49
Agency—Compton Adv., Inc.

STANDARD PRODUCTS, INC 65
Agency—The McCormick-Armstrong Co.

STEEL PRODUCTS ENGINEERING CO., THE 71
Agency—Geyer, Newell & Ganger, Inc.

STRATOS DIV., FAIRCHILD ENGINE & AIRPLANE CORP. ..... Third Cover
Agency—Buchanan & Co., Inc.

SUNDSTRAND MACHINE TOOL CO. ..... Second Cover
Agency—Howard H. Monk & Assoc.

TEXAS ENGINEERING & MFG. CO 63
Agency—J. R. Taylor, Inc.

THERMO ELECTRIC COMPANY 53
Agency—Fred Lange Associates, Inc.

TRANS WORLD AIRLINES, INC 65
Agency—Batten, Barton, Durstine & Osborn, Inc.

UNITED AIRCRAFT CORP 15
Agency—Geyer, Newell & Ganger, Inc.

VLIER MANUFACTURING CO 38
Agency—Willard G. Gregory & Co.

VOI-SHAN MANUFACTURING CO., INC 74
Agency—Edward S. Kellogg Co.

WELDED CONSTRUCTION ENGINEERING CO 84

WHITE DENTAL MFG. CO., S. S 56
Agency—Peterson & Kempner, Inc.

WITTEK MANUFACTURING COMPANY 69
Agency—The Advertising Corp.

WYMAN GORDON CO 6
Agency—John W. Odlin Co., Inc.

ZIEGLER STEEL SERVICE CO 45

SEARCHLIGHT SECTION
(Classified Advertising)
H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 85-86
Positions Wanted 85

PLANES—EQUIPMENT
(Used or Surplus New)
For Sale 85, 88-91

WANTED
Planes-Equipment 88

Always SWIVEL and ROLL

Extra Value
ANY WAY YOU MEASURE IT

DARNELL

• Save Money, Floors, Equipment and Time by using DARNELL Casters and Wheels . . . Always dependable, these low-cost floor protection products have been made to give you a long life of efficient, trouble-free service.

FREE MANUAL.

DARNELL CORP. LTD.
Long Beach 4, Calif.

60 Walker St., New York 13, N. Y.
36 N. Clinton, Chicago 6, Ill.

EDITORIAL

(Continued from p. 92)

tional unqualified persons in high positions at the expense of qualified technical personnel who do not play politics.

To give some specific examples in Region 2, I would like very much to see the qualification record and background of the Chief of Scheduled Air Carrier Operation. . . . It seemed that he obtained his airline transport certificate from subordinates and has neither the experience or know-how to qualify for such a rating. It is our understanding that this man first soloed in 1943 on a Fairchild 24, and all flying experience since that date has been obtained within CAA. This man is in charge of aviation safety for scheduled and air carrier operation.

NO CIVIL EXPERIENCE

The newly appointed Chief of Aviation Safety, Region 2, learned to fly in the Navy and has been with CAA for about six or seven years and has had practically no experience in civil aviation. Yet he is the man who sets the policies concerning all seven phases of the operation with which we are concerned, as well as the scheduled air carrier. I believe if his experience in these eight divisions were checked that his qualifications would seem very few for this position.

It is our belief that if a thorough, authoritative investigation were to be made, the cause of many accidents would be found with the appointment of high level policy-making personnel.

Of course, other factors are involved. It is my opinion that the cause of accidents could be, and should be, determined by coordination within CAA and certainly to include the technical people who know what makes airplanes operate and fail. Through our own investigating we have found that in Region Two, only one time in the past six years have any engineering personnel been called on to participate in the investigation of the cause of any aircraft accident, including scheduled air carrier.

The same is true with respect to major aircraft repairs and alterations. The present system gives the Maintenance Agent authority for approving anything he cares to approve regardless of his qualifications, his experience or "know-how" without consulting the Engineering Dept. With these engineering services available, it is true that at times an agent will call upon them for help; this being more so in non-scheduled than in scheduled air carrier operations. . . . I do not believe that this condition exists in all areas, inasmuch as some agents realize their limitations and take advantage of the technical services available to them within the organization. But there is no uniform procedure. . . .

STEP TOWARD DICTATORSHIP

The people who headed this reorganization of CAA have not only stepped on the toes of us in the industry and the people within CAA itself who will not play politics, but have also tried to set aside the democratic ways and policies of our government. I say this because I know that in many cases Civil Service employes were not given a chance for promotion or a chance to bid on better positions as is required in Civil Service Regulations. I am much concerned over this fact because I believe it is a step in the direction of a dictatorship.

The recent reorganization of Aviation Safety is obviously a hoax to increase the number of high-salaried incompetents, to bolster the Aviation Safety Empire with men who will support those presently in power at the expense of lives and money of the taxpayers.

The method of examining and selecting top level personnel under the present reorganization of Aviation Safety certainly is a blot on the integrity of the U. S. government, inasmuch as we firmly believe that should the examiners be examined for their ability they will be found incompetent to select by a fair method, honest and qualified personnel to carry out a realistic safety program in aviation.

I hope your tireless effort will bring about an investigation of the entire Aviation Safety Organization of CAA, and that it will be impartial enough to put the blame where it belongs and that those people who care more about power and money than the lives of people get what they deserve—and also give to those within CAA who have held themselves above playing politics a chance to better themselves. . . .

An Official of a Leading Operator in the Southeast

From CAA's Third Region

. . . You certainly have my sincere support . . . on the subject of reorganization of CAA (Office of Aviation Safety). The jeopardy that the small field operators, such as myself, is placed under because of politics in CAA is no small item. . . . I have been under a very one-sided iron hand pressure for the past year because of the small-time politics that is being played in the lowest levels of CAA.

It is a long story that can be briefly told in the fact that I as an individual would not knuckle under to the local agents and felt that I had a right to carry my fight to the regional office without going through the district offices. This action irritated the boys from the district offices up the line.

I still feel, and will continue to do so, that the CAA and those people in it are no more than individuals and when the time comes that you have to play the part of a politician just to get along with them I do not care whether I get along with them or not.

Stay with your fight and maybe someday we will have a good body of CAA personnel, and can get some real things done for the flying public from those in the airline business down to airport operators.

An Executive in an Aircraft Repair and Accessory Manufacturer in the Third Region

Can Hensley & Davis Answer?

If the reorganization of CAA's Office of Aviation Safety last month was not phoney business to build the empire of Ernest Hensley and William Davis, let them answer these questions:

1. How much did the OAS reorganization cost and why was it necessary? We have heard cost estimates from $30,000 to $100,000. An Aviation Week query to Ben Stern, CAA information chief, brought the answer: There's no way to tell. Mr. Hensley has an administrative officer who knows; Mr. Hensley and Mr. Stern know this man knows. Why the mystery?

2. Why were both Civil Service and CAA's own costly national promotion plan only partly utilized in making top appointments in the reorganization? Our answer is that Hensley & Davis could not have rigged the reorganization with only those two sets of rules.

3. Why were no transcripts kept of the individual or group examination sessions? Especially since the group interview counted up to 30 percent of the grade and the individual interview counted up to 20 percent, under the Hensley-Davis grade rigging. Thus, about half of the individual's final "grade" depended on the examiners' unchallenged opinions, reached in closed sessions, without any remaining record of proceedings.

4. Why were some individuals who got low grades told they could have minor "favors" if they promised not to protest formally their new assignments? Did Hensley & Davis fear a precedent-setting formal protest because it would go to Civil Service and might start investigations of the entire OAS plan?

5. Why were Civil Service veterans' rights ignored in notifying those with low grades that they would be transferred or demoted?

6. Why were both examining teams conducted by the top officers of OAS unless they were rigging the show? Mr. Hensley led one team; Mr. Davis led the other.

7. Is it true that the plan establishes an additional Civil Service Grade 14 (Chief, Aviation Safety division) in each region? Is it true the base salary of a Grade 14 is $9800, or an additional total cost increase to the taxpayers of $68,600 for these new Hensley-Davis handpicked posts?

—Robert H. Wood

Stratos SUPERCHARGERS · *Stratos* COOLING PACKAGES

AND NOW IN PRODUCTION

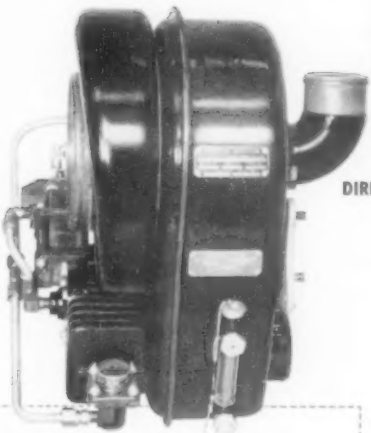
Stratos

AIR-TURBINE DRIVES

For **ALTERNATORS AND GENERATORS**

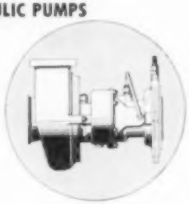
For **DIRECT MECHANICAL ACTUATORS**

For **HYDRAULIC PUMPS**



For **FUEL PUMPS**

- Afterburner
- Inflight Refueling
- Booster



For **JET ENGINE STARTERS**

Typical Stratos Air Turbine Drive. Rated at 15 h.p. for driving aircraft alternator. Stratos *Constant Speed* feature assures constant output frequency under all operating conditions and loads. Built-in fan provides ground cooling for turbine and alternator.

For **HIGH PRESSURE AIR COMPRESSORS**

Operating on bleed air, Stratos air turbine accessory drives have been designed for flexibility of installation and to meet a wide variety of aircraft power requirements. The reliability and long service life features of Stratos Cabin Superchargers and Air Cycle Refrigeration Packages have been incorporated in this new line of versatile Stratos Air Turbine Drives for aircraft.

Stratos Air Turbine Drives maintain *constant speed* under *all* load and operating conditions. They offer the aircraft designer a new power source which is outstanding for its light weight, compactness and suitability to a wide range of tasks. Stratos engineers are prepared to adapt and modify current Stratos designs to meet the *specific* requirements of *specific* installations.

For information on this and other Stratos equipment, write:

Stratos DIVISION

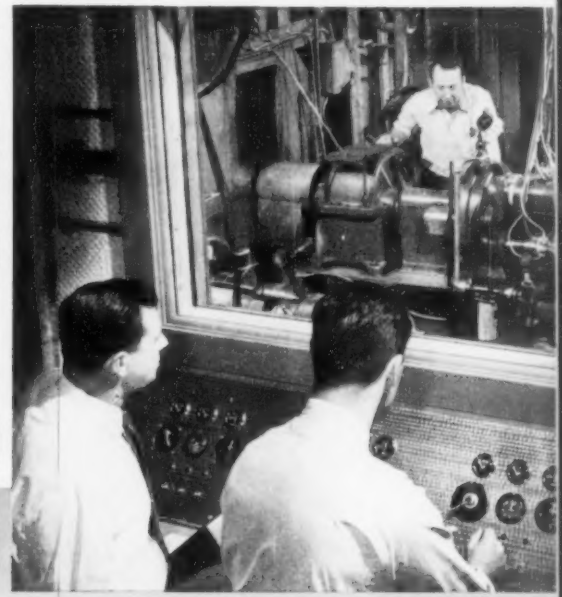
FAIRCHILD ENGINE & AIRPLANE CORP.

Main Office and Plant: Farmingdale, Long Island, N. Y. • West Coast Office: 1307 Westwood Blvd., Los Angeles 24, Calif.

Fairchild Aircraft Division, Hagerstown, Md. • Fairchild Engine and Guided Missiles Divisions, Farmingdale, N.Y.

Flight testing an idea

Complete electrical systems for any given aircraft can be simulated on this network analyzer.



Radial-type engines help this test stand duplicate aircraft power systems for testing purposes.

Even ideas are flight tested at General Electric. Both before and after an aircraft electrical system is built, G-E's aviation divisions check it out under actual operating conditions to save you expensive "de-bugging."

Your power distribution system, for example, is first "flown" on the analyzer. Electrical circuits for your plane are cranked into the board and the idea is worked over until the analyzer OKs it.

A model then gets a long rugged workout in the Aircraft Systems Test Lab to iron out final kinks. When design is "right," production begins. Finally, individual component parts are tested before installation in your aircraft.

Project engineers are chosen for experience as well as scientific "know-how." Pilots, navigators, flight engineers, military and transport, are represented. George Phillips, for instance, shown "flying" a distribution network, is an ex-Air Force maintenance officer.

This combination of theoretical analysis and practical testing by men who know aviation problems means trustworthy electrical systems without extensive "de-bugging" after installation.

For aircraft electrical equipment that will give you long trouble-free service, call your General Electric aviation specialist or write Apparatus Dept., General Electric Company, Schenectady, N. Y.

- TURBOJET ENGINES
- TURBOSUPERCHARGERS
- MOTORS AND CONTROL
- INSTRUMENTS AND AUTOPILOTS
- ELECTRICAL AND SERVO SYSTEMS
- GAS TURBINE IGNITION AND CONTROL
- GENERATORS AND TRANSFORMERS
- ELECTRONICS AND COMMUNICATIONS SYSTEMS

You can put your confidence in—

GENERAL ELECTRIC

21043